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ELECTRIC POWER AND POWER EQUIPMENT

MINTRANSSTROY CITED FOR FAILURE TO MEET DEADLINES AT ZUYEVSKAYA GRES-2

Moscow PRAVDA in Russian 14 Oct 78 p 2

[Article by N. Bykodorov, chief of production section of Donbassenergostroy Trust, N. Khromov, chief technician, and V. Radin, engineer]

[Text] Construction of Zuyevskaya GRES-2 is proceeding for the 3rd year. The rates of construction are very slow. There are many reasons for this. It is felt that one of them deserves special attention.

The national economy will receive ever more energy from newly built electric power plants. The unit capacity of the plants has already reached 1,200 kilowatts. Progress in the construction industry has also been noted. The use of elements of heavy precast structural members has become an ordinary thing.

Does one have to prove that an increase of overall dimensions complicates delivery of freight? Simply speaking, the main work at the construction site must be organized intensively and access railroad tracks are required. This important work has been entrusted to the subdivisions of Mintransstroy [Ministry of Transport Construction] under general contract conditions.

The builders appeared 2 years ago at the construction site of the Zuyevskaya GRES-2. And they began construction of the tracks within 1 year. The contractors initially established a plan of 300,000 rubles. The interference of Stroybank of the USSR forced them to increase the volume to 700,000 rubles (and incidentally they have not coped with this amount). And in order to lay the rails, work worth 2.5 million rubles must be completed. One can only guess when this sum will be assimilated.

Freight is now arriving at stations of the Donetsk Railroad and is accumulating there. And we are becoming convinced of the correctness of the following proverb almost every day: "So near and yet so far." Start-up of the first two energy blocks is planned for next year. But thousands of tons of structural members and materials, extremely necessary for the construction site, are inaccessible to us because there are no access tracks.

Why did this occur? Mintransstroy is not responding to the deadlines for turning the project over for operation. Moreover, the directive document on construction should indicate precisely the time for completion of work by the general contractor.

And something else. Many ministries and agencies are now emerging as the customers of track-building projects. The documentation compiled by organizations of MPS [Ministry of Railroads] and Mintransstroy has long been coordinated with the railroad administrations of MPS. The access tracks are subsequently being transferred to the jurisdiction of MPS. Would it not have been better from the very beginning to turn over the rights of landlordship to the railroad workers?

Large construction sites should be begun with access tracks. This helps to save many public funds and to accelerate introduction of objects into operation.

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ELECTRIC POWER AND POWER EQUIPMENT

CONSTRUCTION OF IGNALINA AES BEGINS

Vil'nyus SOVETSKAYA LITVA in Russian 9 Sep 78 p 1

[Article: "Construction Site of Friendship"]

[Text] The first cubic meter of concrete was poured into the foundation of the first energy block of this giant in a solemn ceremony today in construction of the atomic power plant. A meeting was held in this regard at the site.

The first secretary of the Ignalina raykom of the Communist Party of Latvia K. Kasnkauskas warmly greeted the builders, having wished them success in fulfilling the decisions of the 25th CPSU Congress and their adopted socialist pledges.

Powerful dump trucks loaded with concrete are arriving at the construction site. The drivers of V. Aleknavichyus's brigade won the right to deliver the first concrete to the site in the socialist competition of transport workers. Several tower and truck-mounted cranes, having taken on the load, pour it into the foundation, laying of which the collective entrusted to the best brigade of N. Bakshayev's concrete workers.

Ties of friendship link this All-Union shock komsomol construction site with the entire country. Enterprises of the Ukraine, Siberia and the Far East are sending metal here. The hoisting cranes, earth-moving equipment and dump trucks are noted by emblems of the largest plants of the USSR. The Akmyane Cement-Shale Combine delivers portland cement of high marks and Vil'nyus, Kaunas and Klaypeda plants deliver reinforced concrete structures.

"We are working by a network schedule which the planners of Leningrad and Moscow worked out for us," says the chief of construction of the object G. Sereda. "The beginning of concrete work on 8 September was known beforehand. One can clearly see the significance which good organization of the work has. The planned schedules may only be outstripped, but there must not be a lag in them in any way. Thus, the people of the first construction-installation administration -- the hosts of the energy block of the site --

gave their word to pour approximately 1,000 cubic meters of concrete into the foundation above the plan before the first anniversary of the new Constitution of the USSR and to finish the work ahead of schedule -- before 28 December."

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ELECTRIC POWER AND POWER EQUIPMENT

BILIBINSKAYA AES PRODUCING HEAT

Moscow PRAVDA in Russian 14 Oct 78 p 3

[Article by Yu. Kudimov, Bilibino, Magadanskaya Oblast: "The Atomic Power Plant Is Producing Heat"]

[Text] A powerful boiler plant has become operational: the residents of the young village of Bilibino have received heat from the nuclear reactor of the Arctic atomic power plant.

The Bilibino residents tell the following joke:

"We not only have atomic 'candles' but also 'furnaces' in our apartments."

The houses here were previously heated with boilers and by some furnaces that had outlived their time. The minus 50-degree cold held the exhaust smoke above the village in winter. It hung like a roof.

We are standing in white smocks and transparent overshoes with the secretary of the party committee of "atomic workers" Mikhail Klimov in the reactor room or as they say here in the "strict regime zone." It is quiet. Nothing gives away the reactors' operation. The atomic heart of Chukotka is beating with a powerful pulse under our feet.

The main heating pipeline -- pipes enclosed in sheet steel glistening in the sun -- has been laid from the Bilibinskaya AES.

The initial name of the station is BATETs -- the Bilibinskaya Atomic Central Heating and Power Plant. Construction was begun on a bare site among the tundra. The first cubic meter of concrete was poured in May 1969 in the permafrost soil of the trench. Atomic power plants, as is known, have two starts -- "physical" and "energy": uranium-containing rods are loaded into the reactor and the unit is gradually brought up to design capacity. The Bilibino workers solemnly noted the second start on 12 January 1974. But three additional blocks had to be constructed.

We are saying goodbye to Klimov. The road leads downward into the village. The Chukotka October is being swept with the barbs of ground wind. The lights of the atomic power plant are burning -- a real palace among volcanic peaks and tundra.

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CSO: 1822

ELECTRIC POWER AND POWER EQUIPMENT

NUREKSKAYA GES OUTPUT CAPACITY INCREASED

Moscow IZVESTIYA in Russian 28 Sep 78 p 1

[Excerpts from an article by special IZVESTIYA correspondent V. Surkov]

[Excerpts] The seventh unit began no-load operation at the Nurekskaya GES on the eve of the first anniversary of the USSR Constitution. It was installed within 59 days. The new electric machine will produce considerably more inexpensive energy than the entire Tadzhik capital now consumes. The Nurekskaya GES reaches a capacity of 2.1 million kilowatts with start-up of the seventh unit.

This is yet another victory of the participants of the All-Union Nurek "workers' relay-race" -- a progressive form of socialist competition.

The huge dam being erected upward made it possible to accumulate an unprecedented water reserve in the artificial sea: 8.5 billion cubic meters. The accumulation occurred during the recent intensive thawing of Pamir glaciers. The builders and installation subdivisions of the large construction site labored in an intensive rhythm with increased responsibility. The collective of the Nurek section of Spetsgidroenergomontazh Trust [expansion unknown] was distinguished among them.

"Our installers assembled the seventh unit with special care," emphasized the chief of the section V. Migurenko. "And with special responsibility. We are starting a unit immediately for full design capacity -- 300,000 kilowatts -- for the first time during construction of the Nurekskaya GES. And naturally more attention was devoted to preparation and review of each sub-assembly of the electric machine."

Selfless labor by a unified relay-race schedule -- from manufacture of the first parts at Sverdlovsk, Khar'kov, Chekhov, Zaporozh'ye, Leningrad and other plants to installation and start-up -- provided high-quality preparation for operation of the seventh unit ahead of schedule.

The collective of the Spetsgidroenergomontazh section fulfilled the plan of 3 years of the five-year plan ahead of schedule as a whole in honor of the

anniversary of the USSR Constitution. More than 60 units of complex equipment have been installed since the beginning of the five-year plan. The deadline for installation of the electric machines was reduced by 117 days. This made it possible to produce 300 million kilowatt-hours of additional energy.

The man-made Nurek Sea has already produced many billion cubic meters of water to irrigated fields and is irrigating the cotton fields of adjacent republics -- Turkmeniya and Uzbekistan on an area of approximately 1 million hectares. The Soviet government received hundreds of millions of rubles additional profit alone from introduction of the energy and irrigation capacities of Nurek ahead of schedule.

And turnover of the next to last, eighth unit for operation will occur within 2 months. And again ahead of schedule with high quality!

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ELECTRIC POWER AND POWER EQUIPMENT

BRIEFS

UNDERWATER POWER TRANSMISSION--Leningrad--An underwater LEP [Electric power transmission line] has joined two islands in the Neva delta -- Vasil'yevskiy and Belyy. Its 1.5-kilometer cable enclosed in steel pipe filled with a special oil, is designed for a voltage of 110 kilovolts. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 1 Oct 78 p 2] 6521

GES CONSTRUCTION--Sayano-Nogorsk--Acting on instructions received from the construction headquarters of the Sayano-Shushenskaya GES, Yevgeniy Chechil's brigade of hydraulic installers lowered the last gate of the bottom opening in the 39th section of the dam. The birth of yet another man-made Siberian sea was begun in the Sayan Mountains. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Oct 78 p 1] 6521

ELECTRIC POWER PRODUCTION--Six units at the thermoelectric power plants have been introduced ahead of schedule, on the eve of the anniversary of the new USSR Constitution. The total output is approximately 500,000 kilowatts. The unit at the Rudnenskaya TETs [Thermoelectric power plant] (Kustanayskaya Oblast) became operational 2 months ahead of the deadline. The electric power of the new block will help the rural workers of one of the main virgin-land oblasts to process the abundant harvest of this year. The second unit of the Kishinevskaya TETs-2, which became operational 3 months ahead of schedule, will make it possible to significantly improve the heat and energy supply of the capital of the Moldavian SSR. The same acceleration was achieved at the start-up blocks of thermoelectric power plants of the Kama Motor Vehicle Plant and the Volgogradskaya and Karagandinskaya TETs. The success of the builders and installers of GRES-3 of Mosenergo [Moscow Regional Administration of Power System Management], where a turbine with capacity of 100,000 kilowatts was introduced on the eve of USSR Constitution Day, should be especially noted. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 6 Oct 78 p 1] 6521

ELECTRIC POWER PLANT CONSTRUCTION--Bratsk--Modernization and reconstruction of the main equipment of Bratskaya GES has been completed. There are still the same number of units, but the capacity of the plant increased from 4,100,000 to 4,500,000 kilowatts. Bratskaya GES will return the expenditures

for its construction to the state sevenfold by the time restoration is completed. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 8 Oct 78 p 1] 6521

POWER PLANT CONSTRUCTION--Bratsk--The collective of Bratskaya GES completed reconstruction of all the hydraulic generators ahead of schedule, increasing the plant capacity by 400,000 kilowatts. The power engineers jointly with workers of Spetsgidroenergomontazh Trust [expansion unknown] carried out an entire complex of measures to modernize the equipment. The excitation system was replaced on six generators. Electric power production was increased by 90 million kilowatt-hours annually by increasing the efficiency of the rotors in seven hydroturbines. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Oct 78 p 1] 6521

NIZHNEBUREYSKAYA POWER PLANT--Blagoveshchensk--A site has been selected for construction of the second hydroelectric power plant on the Bureya River. Construction of the first GES [Hydroelectric power plant] is planned during the 10th Five-Year Plan on this large tributary of the Amur River. A construction base has now been created on the banks of the river and preparation to erect the main objects of the plant is now underway. It has been decided to construct a second GES -- the Nizhneburevskaya GES -- downstream in the immediate vicinity of the railroad to utilize to the maximum extent the hydraulic power resources of the Bureya River. [Text] [Moscow STROITEL'NAYA GAZETA in Russian 11 Oct 78 p 2] 6521

CSO: 1822

FUELS AND RELATED EQUIPMENT

DEPUTY PETROLEUM MINISTER DISCUSSES 1978 ACHIEVEMENTS

Moscow NEFTYANIK in Russian No 9, Sep 78 pp 1-4

[Article by A. Zhdanov, Deputy Minister of the Petroleum Industry: "Socialist Competition: Its Scope and Specific Nature"]

[Text] This year, the third year of the Tenth Five-Year Plan, was the fourteenth time that Soviet petroleum workers celebrated their own professional holiday -- the All-Union Day of Gas and Petroleum Industry Workers. They faced this day with good results in their work. In the 2 1/2 years of this five-year plan, the average daily volume of oil extraction increased by almost 179,000 tons. Our country has firmly occupied one of the leading positions in the world in the extraction of this most valuable raw material.

The oil workers are also solving serious problems right now. In 1978, it is necessary to introduce new capacities for the extraction of oil and gas condensate in the amount of more than 103 million tons, drill 12 million meters of production wells (1.6 million meters more than in 1977), produce 62.5 billion cubic meters of natural and by-product gas, and assimilate 5.7 billion rubles of capital investments. The fulfillment of this plan is an important link in the realization of the 25th CPSU Congress's decisions on the development of this country's oil industry.

Giving a great deal of attention to the mobilization of workers, engineering and technical personnel, and employees for the fulfillment of their assignments in this third year of the five-year plan, the CC CPSU, USSR Council of Ministers, AUCCTU, and CC Komsomol have addressed Party, government, economic, trade union, and Komsomol organizations, as well as the workers of the Soviet Union, with the letter "On Developing Socialist Competition for the Fulfillment and Overfulfillment of the 1978 Plan and the Intensification of the Struggle for Improving Production Efficiency and Work Quality," which was supported

enthusiastically in every working collective. It is impossible to overestimate the value of this document. Socialist competition stimulates the workers' creative forces and activities and makes it possible to discover production reserves, thereby creating the prerequisites not only for fulfilling, but also for overfulfilling the plan and adopted socialist obligations. The creative nature manifested in the labor in connection with this is having an extremely substantial effect on the further development of scientific and technical progress and, correspondingly, an increase in the productivity of labor. In the social sense, socialist competition shapes a person who is dedicated to the construction of communism and who tries to increase his knowledge and professional skills and improve his moral qualities.

The initiators of socialist competition for the fulfillment and overfulfillment of the plan and socialist obligations for 1978 and the formulation of a worthy greeting to the first anniversary of the new USSR Constitution were the collectives of Glavtyumenneftegaz's Nizhnevartovskneftegaz Association, Komiteft' [Association of the Komi Petroleum Industry], the Krasnokholmskneft' NGDU [oil and gas production administration] of Bashneft' [Association of the Bashkir Petroleum Industry], the Pervomayneft' NGDU of Kuybyshevneft' [Association of the Kuybyshev Petroleum Industry], the Al'met'yevsk UBR [drilling operations administration] of Tatneft' [Association of the Petroleum Industry of the Tatar ASSR], the Neftekumsk UBR of Stavropol'-neftegaz, and the collectives of the crews led by Heroes of Socialist Labor G.M. Levin, I.G. Feklov, M.I. Kharseyev, and K.G. Ikhin, USSR State Prize Laureates A.G. Basyrov, A.G. Abdullin, N.I. Litovchenko, and M.P. Grin, and foremen V.T. Gromov, V.I. Shchava, D.M. Nurutdinov, R.A. Kasimov, V.T. Kim, and R.S. Nur-mukhametov.

I will not name all the points of the socialist obligations adopted by the Ministry's enterprises and organizations in 1978, but will mention only the basic ones. The petroleum workers resolved to overfulfill the gas and oil production plan; reduce the length of the well construction period by 7.3 percent in comparison with 1977; finish drilling 300 wells more than stipulated in the plan, including 250 in honor of the new USSR Constitution's first birthday; save 1.2 billion kilowatt-hours of electricity; produce an economic savings for the year of 90 million rubles through the introduction of new technology and 86 million rubles from the use of inventions and rationalizers' suggestions; train 37,000 qualified workers in the enterprises' educational and training network.

Glavtyumenneftegaz's collectives assumed heavy socialist obligations: to extract 2 million tons of above-plan petroleum for

the year and 1.6 million tons in honor of the new USSR Constitution's first anniversary. In these same categories, Bashneft' assumed the obligation of extracting 200,000 and 100,000 tons, respectively; Tomskneft' -- 200,000 and 150,000 tons, and so on. The initiators of the socialist competition are fulfilling their obligations with honor. For instance, in 6 months the Nizhnevartovskneftegaz Association's collective extracted 452,000 tons of above-plan oil against its obligation of 430,000 tons in honor of the new USSR Constitution's first anniversary; the collective of Komineft' extracted 85,300 tons of above-plan oil when its obligation was 85,000 tons. The drilling crew led by Hero of Socialist Labor M.I. Kharseyev fulfilled its 3-year plan in April, while Hero of Socialist Labor I.G. Feklov's crew did the same in May. On the working calendar of Hero of Socialist Labor G.M. Levin's crew, it is already May 1979.

Throughout the branch for the first half of the year, more than 700,000 tons of above-plan oil and gas condensate was extracted, but the obligations were not completely fulfilled and the oil producers still have much to do to keep their word. Other points of the obligations are being fulfilled more successfully. For instance, 952 million cubic meters of above-plan gas has been extracted and this exceeds the obligation for the year. Construction of 266 above-plan wells has been completed, and this is almost 90 percent of the annual obligation. The well construction cycle has been shortened by 11 percent in comparison with 1977. The obligations for the realization of production, for turnover in the trunk oil pipelines, for saving electricity, and for a number of other important indicators have been fulfilled and overfulfilled.

Turning to the extraction of oil, we should mention that in most areas and throughout the branch as a whole, the fulfillment of the socialist obligations for this indicator is being accomplished under considerable strain, primarily because of further deterioration of the geological conditions for the development of petroleum deposits. However, the collectives in a series of oil regions have succeeded in overcoming all of the difficulties that arose and have fulfilled their assumed socialist obligations. They include the oil workers of Dagneft', Kirgizneft' [Kirgiz Oil Field Administration], Gruzneft' [Georgian Oil Field Administration], Tomskneft', Komineft', Bashneft', Nizhnevolzhskneft', Ukrneft' [Association of the Ukrainian Petroleum Industry], and Mangyshlakneft', as well as other associations.

In view of the fact that the basic deposits in most of the oil-producing regions of this country have entered a late stage of development, the proportion of mechanized wells is increasing

every year. In connection with this, repair work and the improvement of this work's quality, which leads to an increase in the amount of time wells can operate between repairs, has become a matter of exceptional importance. Under these conditions, considerable value is attached to the initiative of the collectives of crews for the underground and capital repair of wells led by foremen and USSR State Prize laureates A.G. Basyrov (Chekmagushneft' NGDU of Bashneft') and M.D. Myndyuk, T.V. Pogonych, I.A. Ivanenko, and V.A. Pikh (Dolinaneftegaz NGDU of Ukrneft'), for their development of socialist competition to improve production efficiency and work quality and to increase the amount of time wells operate between repairs. The Ministry and the Central Committee of the Trade Union of Petroleum and Gas Industry Workers approved this initiative and obligated all oil-extracting associations and trade union committees to be of real assistance to crew collectives and to create favorable conditions for the fulfillment of the socialist obligations assumed by them. Measures of an organizational nature were also implemented. Considering that specialization and concentration of capital repair work can have a significant effect on production, the Ministry followed the path of creating specialized administrations for increasing the oil yield of the beds and improving the capital repair of wells. There are now 10 such administrations in operation, and their experience deserves all possible approval and dissemination. For example, in Tatneft', where the first such administration was set up, the effectiveness of repair and insulation work was increased by 30 percent.

In drilling, work has also been planned for shortening the well construction cycle, which indicator was included in the plan in accordance with the decisions of the 25th CPSU Congress. For the branch as a whole, the duration of the well construction cycle is decreasing every year. For example, although it was 129.3 days in 1975, during the first 5 months of this year it was reduced (according to preliminary data) to 105.8 days, with the goal for the year being 105.4 days. Along with the organizational and technical measures, a large role was played in this matter by the initiative of foreman D.M. Nurutdinov's drilling crew in concluding agreements on collaboration with collectives doing related work for the shortening of the well construction period. This initiative received all possible support and was widely publicized. Although about 500 crews from the leading professions and related jobs concluded agreements on cooperation in well construction in 1977, about 900 collectives have already done so in 1978. This movement's scope is particularly broad in the Tatneft' Association imeni V.D. Shashin, Kuybyshevneft' and Bashneft'. In a number of associations, agreements on cooperation have been concluded by collectives doing related work, as well as by enterprises as a

whole. For instance, in Grozneft' and Stavropol'neftegaz, where well construction takes a long time, agreements on cooperation have been concluded at the enterprise level (UBR, NGDU, UTT, VMK, SMU [construction and installation administration], and UPTO and KO bases).

Matters are going well in the crew led by D.M. Nurutdinov, who was the originator of this initiative. In the first half of this year the well construction cycle was 26.6 days long, against a planned figure of 36 days; 10 wells were drilled and put into operation instead of the planned 9; 16,015 meters of drilling was accomplished, against the planned figure of 12,880 and the assumed obligation of 14,380 meters. Excellent work is also being done by the entire collective of the Al'met'yevsk UBR, where a crew of initiators works. In 1977 it achieved the well construction cycle duration indicator (41 days) that was intended to be reached by the end of the five-year plan.

I must mention yet another important initiative on the part of our petroleum workers.

Western Siberia -- Tyumenskaya Oblast, primarily -- will be of decisive importance for the development of the branch and the fulfillment of the plan and obligations for 1978 and the five-year plan as a whole. In order to do this, it is necessary for the drillers of Glavtyumenneftegaz to drill 4.4 million meters of operational wells in this year alone. In order to carry out this massive work assignment, the drilling organizations of Tatneft', Bashneft', Kuybyshevneft', and Saratovneftegaz have been enlisted in the struggle in Western Siberia, and next year their ranks will be swelled by drillers from Belorusneft' and Ukrneft'. Half of the annual increase in drilling volume will be credited to these organizations.

Not too long ago, the drilling crew led by foremen V.A. Nikerin and Kh.G. Gabdullin, in the Birsksk UBR of Bashneft', turned to all the collectives of crews working by the expeditionary duty method in Western Siberia with a call for the development of socialist competition for the greatest number of meters drilled and the maximum number of completed wells, for the mastery of pipe-laying technology as rapidly as possible, and for improvements in the organization of labor. The Ministry and the trade union's central committee approved this challenge and obligated Glavtyumenneftegaz, Tatneft', Bashneft', Kuybyshevneft', Saratovneftegaz, and the appropriate trade union committees to carry out mass organizational work to disseminate the initiatives of the Birsksk drillers, to direct the competitors' efforts to improving the efficiency and quality of pipe-laying work, and to create for the collectives working in Tyumenskaya

Oblast all of the conditions needed for fulfillment of their production assignments and socialist obligations.

In order to guarantee the fulfillment of the plan and the socialist obligations assumed for 1978, the Ministry and the trade union's central committee worked out and approved an entire complex of measures for the further development of socialist competition, the enlistment in it of all enterprises, organizations, shops, and crews, the dissemination of forms of competition that have been tested in practice and of new innovations, and the creation of conditions for each collective to work successfully.

In March and April of this year, the Ministry held two meetings, attended by the leaders of drilling, derrick-assembly and well-testing crews that had won first places in the All-Union Socialist Competition for Work Results for 1977, as well as the foremen of crews for the underground and capital repair of wells that had won first, second and third places. At the meetings, the foremen exchanged work experiences and discussed the program for the fulfillment of the assignments for the third year of the five-year plan and the obligations assumed for a worthy greeting to the new USSR Constitution's first anniversary. From the platform of these meetings, the drilling foremen, engineers and repair workers addressed all collectives engaged in gas and oil well construction and repair, in the names of their own crews, to develop socialist competition under the mottos, "We Will Install, Repair and Master Ahead of Schedule," "Oil Wells -- on Line," and "All Wells -- Among the Ranks of Producers."

As one of the important points in their socialist obligations for 1978, all the progressive collectives included the tutoring of backward collectives. Their goal is to bring these collectives' indicators as close as possible to the level of the best ones, thereby creating realistic conditions for the fulfillment of the planned assignments by a small number of crews. The slogans, "No One Lags Behind" and "All Collectives to the Front With the Leaders" will become the basic program of action of each working collective.

A good example of collective tutoring is offered by the crew of drilling foreman and Hero of Socialist Labor I.G. Feklov, from the Otradnenskoye UBR of Kuybyshevneft'. It undertook to help the crew of young foreman Yu.I. Soloshchev, which had not carried out its planned assignments. For short periods of time, Feklov and his best workers joined the lagging crew in order to teach its members progressive labor methods and raise the level of its production work. In turn, the drilling foreman and workers from Soloshchev's crew joined Fedlov's crew. As a

result of this, Soloshchev's crew overfulfilled its well-drilling plan for 1977 by 2.3 percent, and for the first half of 1978 by 21.4 percent.

In this respect, the operational and planned dissemination of the experience of progressive crews, the newest production organization methods, and the best examples of management practices take on particular importance. CC CPSU General Secretary and Chairman of the Presidium of the USSR Supreme Soviet, Comrade L.I. Brezhnev, said: "At the present stage, the force and effectiveness of socialist competition do not lie in individual records, excellent though they may be, but in the fact that each collective works without lagging, in an accurate and coordinated manner." The initiative of I.G. Feklov's crew found widespread support among the branch's leading collectives.

The standards research stations are doing very good work in the dissemination of progressive experience. Last year alone, 3,279 leaflets, posters and brochures were published for the dissemination of progressive experience. In the first half of 1978, 2,845 such publications were issued. The savings from the introduction of suggestions derived from them was more than 23 million rubles in 1977.

Dissemination of the experience of USSR State Prize and Leninist Komsomol Prize laureates is of particular value in propagandizing the achievements of progressive figures in socialist competition. In 1977, the USSR State Prize laureates included M.P. Grin' (drilling foreman, Tatneft' imeni V.D. Shashin), derrick-assembly crew chiefs N.I. Litovchenko (Glavtyumenneftegaz) and K.G. Ikhin (Bashneft'), and A.G. Basyrov (foreman, underground well repair crew, Bashneft'), while among the Leninist Komsomol Prize laureates were V.S. Glebov (Glavtyumenneftegaz), A.S. Pyatkov (Kuybyshevneft'), P.S. Khodakovskiy (Tomskneft'), A.F. Sinchurin (Tatneft'), and A.S. Prokayev (Orenburgneft').

The laureates' work have been publicized in leaflets and posters and their experiences have been discussed in the branch press. Innovation sessions are held in the crews of the foremen-laureates. For instance, at the base of K.G. Ikhin's derrick-assembly crew (Bashneft'), there was an innovation session during which the collective established a labor record: the cycle of construction and assembly work on a borehole was completed in 7 hours. The participants in the session familiarized themselves with the labor methods and procedures, the technology that is used, and charts of the labor process. V.I. Afanas'yev's derrick-assembly crew, in the Tuymazy UBR, decided to use the knowledge gained at this session to set up a

drilling rig as quickly as possible, and managed to do it in 8.5 hours when the norm is 32.6 hours.

Separate mention should be made of the work of the production instruction services. Instruction teams give practical assistance to collectives of production workers, teaching them how to cut down on the time and labor needed to perform production operations, how to introduce NOT [scientific organization of labor] methods where they work, and how to master new equipment. These teams are made up of highly qualified drillers, operators, foremen, and professionals who are labor veterans and who have an excellent knowledge of work techniques, technology and organization; they are intelligent and experience people. In an average year, they instruct about 30,000 people in the production process.

Agreements on creative cooperation between the collectives of industrial, construction and transport enterprises and scientific research and planning organizations are becoming more and more widespread.

For a number of years now, Komineft' has had an agreement with USSR Ministry of Geology's Ukhta Territorial Geological Administration, the Komineftegeofizika trust, Glavkomigazneftstroy, the Usinskstroy trust, the PecherNIPIneft' institute, the Northern Trunk Oil Pipeline Administration, the Sosnogorsk Department of the Northern Railway, and the Ukhta Petroleum Refining Plant. Under the slogan "For the Important Oil of the North," the competitors' efforts are directed at the most rapid possible development and mastery of the Komi Republic's oil deposits.

Since 1975, the Permneft' Association's collective has had agreements with the Krasnokamsk Oil Pipeline Administration, the Permnefteorgsintez association, the Perm' Gas Refining Plant, Glavneftesnab's [Main Administration for the Transportation and Supply of Petroleum and Petroleum Products] Perm' Administration and Construction Trust No 15; Bashneft' -- with Bashneftekhimzavod, the Ural and Siberian Trunk Oil Pipeline Administrations, RSFSR Glavneftesnab's Bashkir Administration, and the BashNIPIneft' and VNIISPTneft' institutes, where the competition proceeds under the slogan "From the Well to the Consumer." Other enterprises have concluded similar agreements. They are obligated to render each other all possible cooperation and assistance in the fulfillment of assumed socialist obligations.

Competition in the associations has also been raised to a qualitatively new level. It is acquiring more and more specificity, uniting the workers' creative initiative and efforts, and

making their actions more purposeful and coordinated, as well as making it possible to solve the branch's main problems more efficiently and quickly. There are different types and forms of this competition. In Bashneft' it proceeds under the slogan "From Each Well -- the Maximum Oil"; Kuybyshevneft' has organized a competition among the drilling crews for the economic expenditure of facilities and the achievement of record rates for pipe-laying operations; in Azneft' [State Association of the Azerbaijani Petroleum Industry] it is between NGDU's to lengthen the period of well operation between repairs, between drilling crews for the Prize imeni R. Rustamov, and between oil-extraction units for the stabilization of oil production and a reduction in the number of nonoperational wells; Kaspmorneft' conducts competitions for the Prize imeni M. Kaverochkin and for the titles of "Best Crew in Scaffolding and Worksite Construction" and "Best Crew for Marine Foundation Construction"; among the young workers at Nizhnevartovskneftegaz there is a competition under the slogan "For the 60th Anniversary of Komsomol -- 6 Shock Months"; Permneft' is conducting a competition for professional skills among the work crews in the leading professions, and so forth.

The highest form of socialist competition -- the movement for a communist attitude toward labor -- is now broadly practiced. The participants in this movement include workers, engineers, white collar workers, and even the collectives of crews, shops and enterprises. More than 491,000 petroleum workers took part in the movement for a communist attitude toward labor in 1977. The honored title "Shock Worker of Communist Labor" was conferred on more than 254,000 people; the title "Collective of Communist Labor" was awarded to 35 enterprises and 7,431 sections, units and crews throughout the branch.

When the results of the socialist competitions in enterprises and organizations are summed up, it is necessary to make a careful analysis of the work of each subunit, giving special attention to the causes of unsatisfactory work by backward collectives, for the purpose of giving them the necessary practical assistance.

The petroleum workers' intense labor met with great success. More than 270 crews in the leading professions have already fulfilled their assignments for the first three years of the Tenth Five-Year Plan. (A list of these crews began to be published in last month's issue of NEFTYANIK).

There is no doubt that the production collectives of petroleum workers will fulfill their socialist obligations and the state plan for 1978 and the Tenth Five-Year Plan as a whole.

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METHODS FOR INCREASING OIL YIELD FROM BEDS OUTLINED

Moscow NEFTYANIK in Russian No 9, Sep 78 pp 5-9

[Article by Professor G.G. Vakhitov, doctor of technical sciences, Director, All-Union Scientific Research Institute of Petroleum and Gas: "Ways of Increasing the Percentage of Oil Extracted From the Earth"]

[Text] In the USSR, the basic method for exploiting oil deposits is (and will be for the near future) the flooding of oil-bearing beds. The extensive use of this method has enabled our country to achieve a high level of annual oil production. However, we cannot be completely satisfied with these successes, either now or (even more so) in the future. Actually, the traditional exploitation methods make it possible to extract from a bed an average of no more than 50 percent of the oil in it. Although under favorable geological conditions only 30-40 percent of the oil remains in the bed after flooding, 60-90 percent of the initial oil reserves can remain in it when the pool has a complex geological structure and the oil's viscosity is higher. Since the prospects for discovering new oil reserves are primarily related to regions that are difficult to reach in the North and Eastern Siberia, the problem of increasing the oil output from beds has become one of great national importance.

As is known, when flooding is used the oil yield of beds depends on many factors, the main ones of which are the viscosity of the oil and the displacing agent, the penetrability and heterogeneity of the bed, the interphase tension on the oil-displacing agent interface, and so on. The oil yield of beds

can be increased by taking purposeful action on each of these factors individually or in combination.

For instance, lowering the oil's viscosity (thermal methods of affecting the bed) or raising the displacing agent's viscosity (polymer flooding) leads to an increase in the bed coverage rate when flooding is used. A reduction in the surface tension on the oil-displacing agent interface (using methods involving displacement of the oil by solutions of surface-active substances and alkalis, micellar solutions and solvents) can also be achieved by increasing the displacement coefficient.

In the USSR (as in other countries), methods are now being used to increase oil yield that are based on the flooding process and each of these, while retaining all of its own advantages, also has additional qualities for increasing the percentage of oil extracted.

The methods for increasing the oil yield of a bed are divided into several groups.

The first group -- the group of hydromechanical methods -- includes cyclic action on the bed, changing the directions of the filtration flows, and increasing the injection pressure. A method of programmed cyclic flooding that includes elements of all these processes has been proposed at VNII [All-Union Scientific Research Institute of Petroleum and Gas]. The suggested modification of cyclic flooding is based on the use of hydrodynamic, capillary, elastic, and gravitational forces, which will provide better coverage of the bed by the displacement process. The essence of this method consists of establishing a definite periodicity rule governing the operation of the injection and production wells, as a result of which there is a redistribution of the liquid between layers and sections with different permeability. A further result is an increase in the flowing yield of oil; the bed's oil yield increases by 2-5 percent and there is a substantial reduction in the water content of the extracted oil.

The simplicity of this method should be mentioned -- it requires no substantial re-equipping of the standard system for flooding an oil deposit. Additional capital investments are used to install equipment that makes it possible to increase the injection pressure periodically in different sections of the injection rows. It is this simplicity of implementation and the possibility of using it in combination with other methods that make the programmed cyclic flooding method a promising one for widespread introduction.

This method underwent experimental production testing in the Dolina, Pokrovskoye and Trekhozernoye deposits, several areas in the Romashkinskoye deposit, and others. As an example of the cyclic flooding method's promise, its use in one of the blocks of the Abdurakhmanovskaya area made it possible to extract an additional 20,000 tons of oil after 5 cycles of working condition changes; this was about 10 percent of the total amount of oil extracted during the experiment (Figure 1).

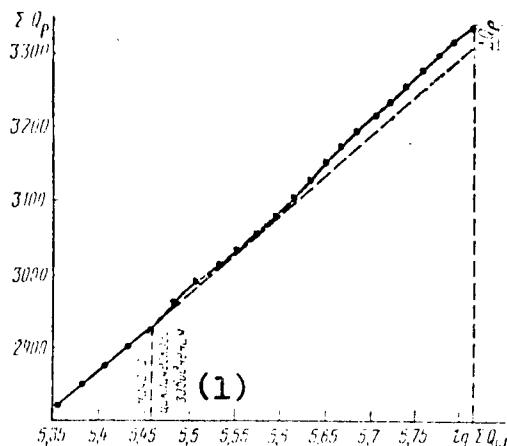


Figure 1. Determination of increase in oil yield because of cyclic flooding:
 ΣQ_p = accumulated oil yield;
 ΣQ_w = accumulated water yield;
 ΔQ_p = increase in oil yield because of cyclic flooding.

Key: 1. Beginning of cyclic flooding

surface-active substances of the OP-10 type is being tested in several deposits in the USSR. According to data provided by the BashNIPIneft' institute, it provides a 2-6 percent increase in oil yield, which is not a complete solution to the problem because of the inadequate effectiveness of the PAV OP-10, which reduces the surface tension at its interface with oil to only 3-8 d/cm. At the present time, therefore, the branch's institutes and institutes under the USSR Academy of Sciences are doing exploratory research on the synthesis of more effective PAV's that will provide a reduction in surface tension on the interface with the oil to a value of less than 0.01 d/cm.

In connection with this, a great deal of attention is being given to the method of flooding with margins of micellar solutions, which are stable microemulsions of water and a hydrocarbon liquid that are stabilized with oil-soluble PAV's in the

The second group -- the group of physicochemical methods for increasing the oil yield of beds -- is the most numerous one. It includes methods in which an abrupt change in the magnitude of the surface forces on the "oil-water" and "oil-water-rock surface" interfaces or the relationship of the mobilities of the oil and the injected water is caused by the creation in the bed of margins of solutions of several chemical substances. The chemical agents used are different types of PAV's [surface-active substances], polymers, alkalis, micellar solutions, acids (sulfuric, hydrochloric, oxidates, and others), and carbon dioxide.

At the present time, the method of flooding with water-soluble

According to data provided by the BashNIPIneft' institute, it provides a 2-6 percent increase in oil yield, which is not a complete solution to the problem because of the inadequate effectiveness of the PAV OP-10, which reduces the surface tension at its interface with oil to only 3-8 d/cm. At the present time, therefore, the branch's institutes and institutes under the USSR Academy of Sciences are doing exploratory research on the synthesis of more effective PAV's that will provide a reduction in surface tension on the interface with the oil to a value of less than 0.01 d/cm.

presence of auxiliary substances (codetergents). At the present time, the most effective solutions are based on petroleum sulfonate PAV's and codetergents (oxyethylated alcohols, esters and other organic compounds). Stability and high displacement capacity of a solution are achieved by the correct choice of the ratio of its components for the specific physicogeological conditions in the bed and the properties of the fluids saturating it. The low surface tension (less than 0.001 d/cm) at the interface with oil that is provided by micellar solutions guarantees that practically all of the oil will be displaced from a porous medium. In connection with this, the oil yield factor can reach 80-90 percent, against the 40-50 percent achieved by normal flooding. The most important thing is that micellar flooding insures highly efficient displacement of the oil from the bed at the late stage of oil deposit exploitation. It is assumed that it will be most widely used as a method for completing the extraction of oil from previously flooded deposits.

The basic prospects for a maximum increase in the oil yield of beds are related to the method of displacing oil with micellar solutions. In passing, let us mention that the prospects for using PAV's are also closely related to micellar solutions and emulsions, since the normal aqueous solutions of PAV's are heavily absorbed by rock. The technology of the process of oil displacement by micellar solutions consists of five stages. First, fresh water is injected into the bed in order to lower the concentration of Ca and Mg ions. Next, a 1.5 percent NaCl solution is injected. The buffer margin that this creates contributes to the preservation of the micellar solution. The total volume of liquid injected during the first two stages is 30-50 percent of the bed's pore volume. In the third stage, the micellar solution is injected into the bed in an amount equalling 5-10 percent of the latter's pore volume. Next, a polymer margin of up to 50 percent of the bed's pore volume is created. During the injection process, the polymer concentration is gradually reduced to a minimum. In the fifth and final stage, fresh water is again injected, after which stratal water can be injected.

The micellar flooding process will be tested in the near future in an experimental section of the Aznakayevskaya area of the Romashkinskoye field. During this test it will be necessary to solve such problems as optimization of the injection volumes and the composition of all the margins, efficiency of the processing equipment, and accuracy of the monitoring and measuring instruments.

In a number of cases, low surface tension at the interface with the oil can be achieved by injection into the bed of alkaline solutions (sodium hydroxide, sodium silicate and others) in a

0.05-1 percent concentration and with a margin volume on the order of 10-20 percent of the pore volume of the bed being drained. The effect of reducing the surface tension is seen when the alkaline solutions come in contact with oil containing increased amounts of organic acids, resins and asphaltenes. Depending on the magnitude of the reduction in surface tension at the "oil-alkali solution" interface, three groups of oils can be separated out. The first group includes especially active oils, at the boundary of which with the water phase even small concentrations of alkali reduce the surface tension to less than 0.002 d/cm. The second is the group of active oils, for which the surface tension at the boundary with the alkaline solution drops to 0.02 d/cm. The third group includes the oils for which the surface tension at the boundary with the alkali does not exceed 4 d/cm. The nature of the change in surface tension at the "oil-alkali solution" interface is shown for the different types of oils, as a function of the alkali's concentration, in Figure 2.

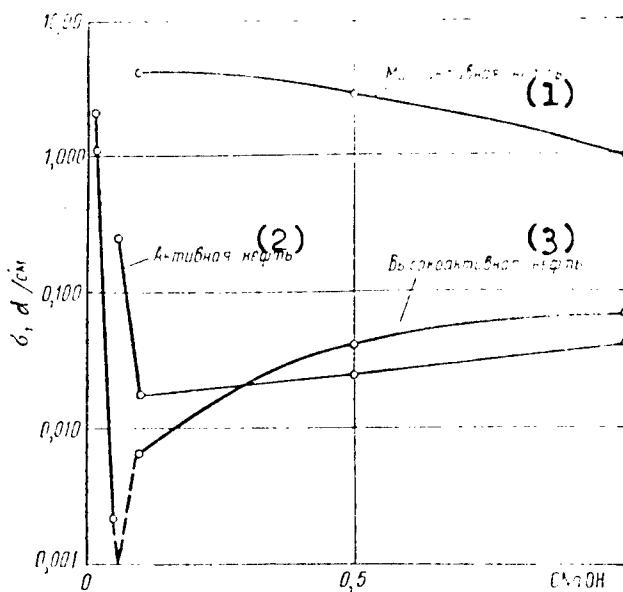


Figure 2. Characteristics of the change in surface tension (σ) at the "oil-NaOH solution" interface.

Key:

1. Low-activity oil
2. Active oil
3. Highly active oil

The realization of the alkali flooding method is quite simple. The use of its different variants will make it possible to increase a bed's oil yield by 5-20 percent in comparison with normal flooding. Experimental tests of the alkali flooding

process were conducted in 1977 in the Trekhozernoye deposit. Testing was also begun in the Kyurovdag deposit and plans are being made for testing in several others.

In order to increase the efficiency of flooding and raise the oil yield of beds, we use the effect of equalizing the mobilities of the oil and the water that displaces it, which effect is created with the help of flooding with a margin of an aqueous solution of a polymer. A water-soluble polymer -- partially hydrolyzed polyacrylamide (PAA) -- is used to produce the margin. Depending on the viscosity of the oil being displaced, the polymer's molecular weight, and the permeability and heterogeneity of the reservoir, the polymer concentration in the solution ranges from 0.025 to 0.1 percent, while the margin's volume is varied from 10 to 30 percent of the bed's pore volume. The use of this method is most effective in the early stage of oil deposit exploitation. In particular, this was demonstrated by experimental production testing of polymer flooding in the Orlyanskoye deposit in Kuybyshevskaya Oblast. In this deposit, two domes (northern and southern) were pierced by concentric rows of production wells, with the injection wells being located in the center. The rows were situated at distances of 400 and 800 meters from the injection wells. The viscosity of the oil in one section was 12.2 centipoise, while in the other it was 8.6 centipoise.

The injection of polymer into the northern dome was begun during the early stage of bed exploitation (the wells in the first row gave waterless oil), while for the southern dome it was done at a later stage (the water content of the oil from the first row of wells had already reached 70-90 percent). An analysis of the results showed that the effectiveness of the polymer flooding process was considerably higher in the northern dome. There, more than 3,000 additional tons of oil were produced per ton of polymer injected into the bed (on conversion to a 100 percent concentration), while only 800 additional tons were produced by the wells in the southern dome.

In our opinion, the use of flooding with carbonic acid is a quite promising method for increasing the oil yield of beds in this country. The prospects for using this method are related to both its high technological efficiency and the existence of an adequate amount of the necessary reagent (chemical production waste products, flue gasses). The effectiveness of the method of flooding with carbonic acid is related to the fact that when carbon dioxide dissolves in oil, the latter's viscosity decreases and its volume increase, while when it dissolves in water, the latter's viscosity increases slightly and its displacing properties improve. This method can be used

successfully both at the beginning of deposit exploitation and at later stages.

This method has been studied under laboratory conditions and tested under production conditions in the Tuymazinskoye (USSR), Budafa, Lovasi and Kishchekhi (Hungarian People's Republic), and (Kelli-Snayder) (United States) deposits, among others.

Its use provides a 7-15 percent increase in oil yield when compared to normal flooding. It should be used extensively in the future, because along with increasing a bed's oil yield it also solved the problem of utilizing the carbon dioxide that is a waste product of the chemical industry. At the present time its use is restricted because of a lack of the necessary facilities for collecting and transporting the carbonic acid.

Methods for increasing the oil yield of beds by injecting various acids into them have come into widespread use, and have the additional advantage of utilizing the acid wastes of petrochemical production processes. Sulfuric acid is the one that is normally used. Its injection on industrial scales has been introduced in Tatariya, Bashkiriya and several other regions. The technology of its use is quite simple: 600-2,000 tons of concentrated sulfuric acid is injected into an intramargin injection well (that is, into the pure oil zone), after which water is injected as usual. PAV's that contribute to increasing the bed's oil yield form as a result of the sulfonation of the oil under bed conditions.

Testing of the acid method in the Romashkinskoye deposit led to a 10-20 percent increase in waterless yield and a 7 percent increase in the final oil yield, with 20-100 additional tons of oil being extracted per ton of injected sulfuric acid.

Another extremely promising method is the use of oxidate (a mixture of organic acids, esters, alcohols, ketones, and other compounds), which is also a petrochemical production by-product. When oxidate interacts with the carbonate fraction of rock, there is an increase in the bed's permeability and carbon dioxide and heat are generated, both of which contribute to increasing the bed's oil yield. In addition, oxidate dissolves quite well in oil and reduces its viscosity.

The next group of methods involves increasing the oil yield of beds by the injection of hydrocarbon gas. This group includes the injection of hydrocarbon gas at high pressures and its injection in combination with water, at any pressure.

When the high-pressure gas injection method is used, the gas dissolves in the oil, thereby increasing its volumetric

coefficient and reducing its viscosity. The increase in oil yield that takes place can reach 20 percent as compared to normal flooding. The bed coverage factor increases when gas and water mixtures are injected. In this case, the increase in oil yield averages 6-10 percent.

The hydrocarbon gas injection method has been tested in the Ozek-Suat, Klyuchevoye, Novo-Stepanovskoye, and other deposits. Positive results were obtained everywhere.

The last group of methods for increasing oil yield involves exerting a thermal effect on the bed by injecting a heat carrier and by intrabed combustion.

Injection of a heat carrier into a bed is accompanied by a number of phenomena that contribute to an increase in oil yield: lowering of the oil's viscosity, a change in the phase permeabilities, thermal expansion of the bed system, an improvement in the capillary characteristics. Steam is the most effective heat carrier. In connection with this, the consumption rate of steam per ton of oil extracted has a decisive effect on the economic indicators of the process of thermal action on a bed. A significant reduction in the steam consumption rate can be achieved by changing from the continuous injection of the heat carrier into the bed to the use of thermal margins. In this case steam is injected during the initial stage of the process only, after which water is injected into the bed as usual.

At the present time, the process of oil displacement by steam margins is being used successfully in the Okha and Katangli (Sakhalinskaya Oblast), Kenkiyak (Aktyubinskaya Oblast) and Borislav (Ivano-Frankovskaya Oblast) deposits. In addition, steam injection is being used in the Yarega deposit (Komi ASSR).

In the Okha deposit, steam is injected into several shallow (200-350 meters) beds that are saturated with viscous oil (250-1,200 centipoise). The use of the steam injection method in combination with flooding led to a sharp improvement in the exploitation rate of this severely depleted deposit. The annual oil extraction rate increased by a factor of 3-5. In Field 4 of this bed's Block 10, an oil yield figure of 0.48 was achieved for a specific steam consumption rate of 2.3 tons per ton. In 1977, 60 steam injection, 35 water injection and about 350 production wells were in operation in this deposit. The use of the steam injection method resulted in the extraction of more than 200,000 tons of oil last year.

The process of oil extraction by a combination of intrabed combustion and flooding is based on the direct generation of heat in the bed through the partial combustion of the oil in it. In

connection with this, air and a certain amount of water are injected into the bed. When this technique (moist intrabed combustion) is used, extensive heated zones that are saturated with steam and condensed hot water form in front of the combustion front. Under optimum conditions for the implementation of the process, a ratio of 1-20 m³ of water per 1,000 m³ of injected air is maintained. The amount of oil that burns in the bed does not exceed 5-8 percent of the original content. The formation of heated zones ahead of the combustion front in the bed makes it possible to accelerate the bed's thermal treatment and "burn up" only part of it and, consequently, reduce the expenditure of compressed air for the extraction of the oil. In addition to this, a savings in the amount of air injected into the bed is achieved by reducing its specific consumption rate for the burnout of a unit of bed volume though more efficient displacement of the oil by the steam ahead of the combustion front. A reduction in the air consumption rate is also achieved by a change (at a certain stage) to displacement of the thermal zones that have formed by the injection of water alone into the bed.

When it is combined with flooding, the extraction of oil with the help of intrabed combustion can be used efficiently and profitably for a wide range of physicogeological oil deposit conditions. This process has been used for 4 years in the Khorasany area in the Azerbaydzhan SSR. The productive horizon lies at a depth of about 300 meters and has total and effective thicknesses of about 60 and 35 meters, respectively. The bed's porosity level is 24 percent, while its permeability is 0.5 darcy. The oil's viscosity under the bed conditions is 140 centipoise and its density is 0.932 g/cm³. In accordance with the test program, during the first stage (in 1973) only air was injected into the bed (dry combustion). In the second stage (since 1974), a small quantity of water was injected into the bed along with the air; this was accompanied by a stable, positive reaction in the bed. As the moist intrabed combustion developed, there was also an increase in the additional oil yield.

At the present time there are 6 injection and about 40 production wells, which react to the intrabed combustion process, on the experimental section. The dynamics of the oil production and those of the injection of air and water into the bed are shown in Figure 3. At the end of 1977, the section's average monthly oil yield was triple what it was when the process was initiated in 1972, while for 1977 as a whole, the introduction of the moist intrabed combustion process resulted in the extraction of an additional 15,000 tons of oil in the Khorasany area.

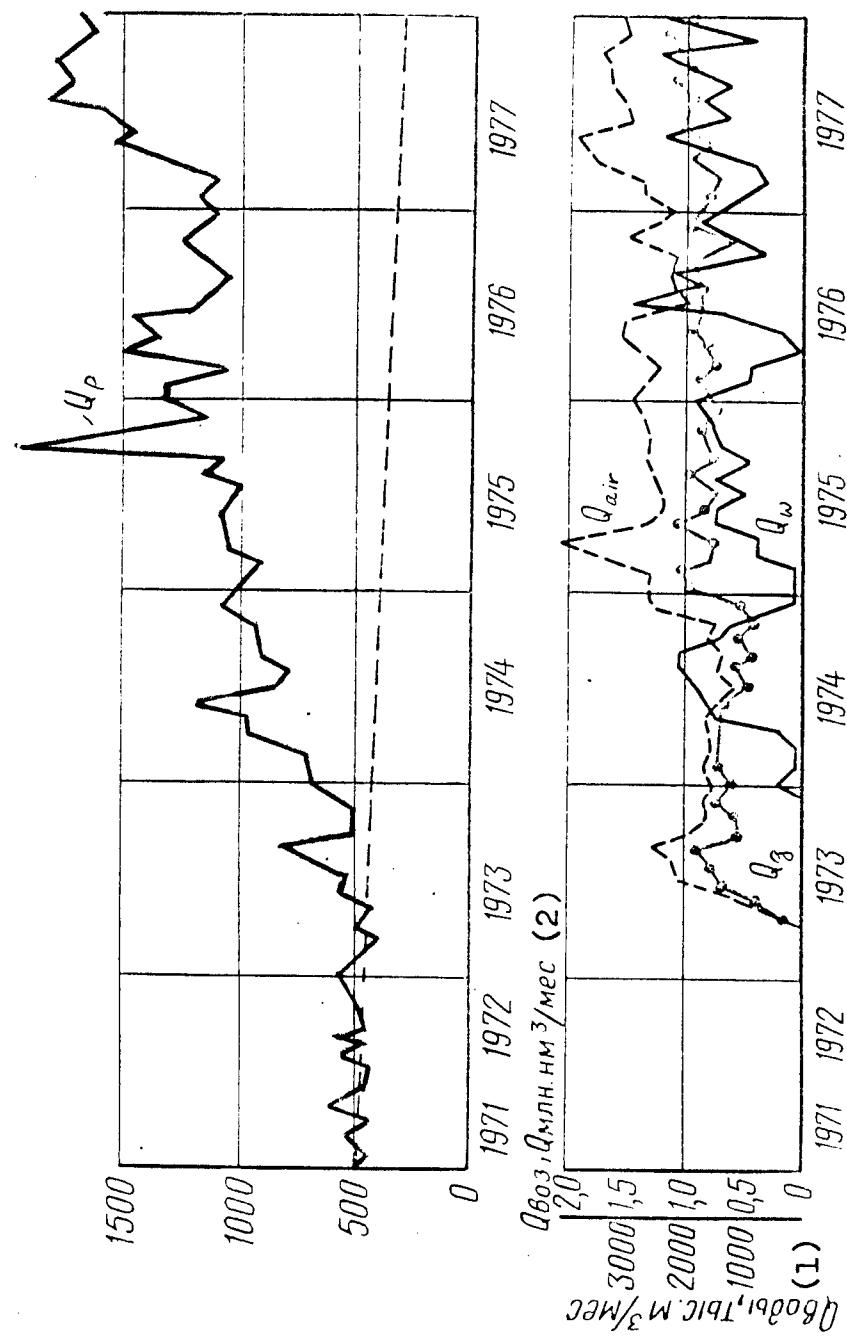


Figure 3. Dynamics of gas and oil extraction and injection of working agents (Khorassany area).
Key:

1. Q_{water} , $\times 1,000$ m³/month
2. Q_{air} , $\times 1,000$ m³/month

Basically, the moist intrabed combustion process is intended for the exploitation of deposits of high-viscosity oil. However, there are certain prerequisites for its effective use in deposits of medium-viscosity oil. At the present time, preparations are being made for the initiation of experimental projects to test the moist combustion process in a previously flooded bed in the Arlanskoye deposit.

The technological and economic effectiveness of methods involving thermal effects (steam injection and intrabed combustion) on oil beds has been proven. However, the extraction of oil in conjunction with thermal action is related to a number of complicating conditions: functioning of the deep equipment under high temperature conditions, the intrusion of sand into the wells, increased corrosion, the need for solutions to environmental protection problems. These problems are now urgent ones, and the future scale of the use of the thermal methods will depend on their solution.

Within the framework of a short article it is impossible to discuss in detail all the methods for increasing the oil yield of beds that are being studied and tested in deposits in this country. Some of these methods have already undergone quite extensive testing and are ready for industrial use (cyclic flooding, displacement of the oil by steam), while others are still being prepared for industrial testing.

It should be mentioned that the introduction of one or another method for increasing oil yield can be accomplished most effectively under those physicogeological conditions to which it best corresponds. In order to determine these optimum conditions, however, it is necessary to conduct extended testing of the method in deposits with different properties and to analyze and correlate the experience gained in using it under different physicogeological conditions.

In accordance with the integrated, long-term program for increasing the oil yield of beds that is being realized in this branch, in the next few years there will be a significant increase in the scale on which methods for increasing the oil yield of beds are used in deposits in this country. This will increase our country's extractable oil reserves and lead to additional production of this valuable raw material.

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FUELS AND RELATED EQUIPMENT

PETROLEUM YIELD IN AZERBAYDZHAN REVIEWED

Baku VYSHKA in Russian 17 Oct 78 p 2

[Article by K. Vartapetov: "All Forces--For an Upsurge in Petroleum Extraction"]

[Text] The results of the work of the republic's petroleum industry in the past nine months indicate that many collectives of the oil and gas extractive administrations, having made a good start at the beginning of the year, were able to gain the goals achieved securely and to go farther. The NGDU [Oil and Gas Extractive Administration] imeni 22d CPSU S"ezd must particularly be included among these collectives. The Neftyanyye Kamni workers are leading in the socialist competition and extracted almost 90,000 tons of liquid fuel in addition to the plan, which is considerably more than the commitments adopted, and essentially solved the problem of stabilizing extraction.

At the old, long worked deposits located on dry land, the search was continued for internal reserves and work was implemented according to plan to introduce modern methods of increasing the oil yield of the beds. Due to this the entire NGDU of Apsheron, as well as Shirvonneft', Sal'yanyneft', Siazanneft' and Neftechalanneft' overfulfilled the nine-month assignments. For example, the Kirovneft' collective extracted from underground 8,785 tons of oil in addition to the plan, Sal'yanyneft'--almost 7,000, Artemneft'--6,503, Shirvonneft'--f,163 and Ordzhonikidzeneft'--4,213 tons.

The gas extraction has been proceeding at high rates. The largest share was given to the above-plan store of the five-year plan by the marine oil workers of the NGDU imeni N. Narimanov--over 195 million cubic meters. Extracted above the plan at the administrations were: imeni Serebrovskiy--over 184 million, and imeni 50-Letiye SSSR--161 million cubic meters of the blue fuel. On the whole, the Kaspmorneft' Association, which includes the collectives of the NGDU listed, sent to the consumers over a half billion additional cubic meters of this valuable fuel and chemical raw material.

The Azneft Association overfulfilled the gas extraction assignment by almost 149 million cubic meters, and it is important to stress that 5 of the 11 administrations (Ordzhonikidzeneft', Azizbekovneft', Siazanneft', Sal'yanyneft' and Neftechalaneft') considerably exceeded last year's indicators.

WHO IS AHEAD

Fulfillment of Socialist Commitments
by the Collectives of the Azneft' and Kaspmorneft' Associations

Basic items of commitments	By commitment for the year	Actual fulfillment in 9 months
AZNEFT'		
Extract oil above the plan	50,000 tons	21,822 tons
Extract gas above the plan	8 million cubic meters	148,692,000 cubic meters
Drill wells above the plan	6,3000 cubic meters	181 meters
Produce gross output above the plan	500,000 rubles worth	1,407,000 rubles worth
Sell products above the plan	500,000 rubles worth	350,000 rubles worth
KASPMORNEFT'		
Extract oil above the plan	200,000 tons	Short 29,213 tons
Extract gas above the plan	220 million cubic meters	558,961,000 cubic meters
Drill wells above the plan	10,000 meters	in debt 11,831 meters
Produce gross output above the plan	2,100,000 rubles worth	3,377,000 rubles worth
Sell products above the plan	2,800,000 rubles worth	5,799,000 rubles worth

All this made it possible for the Azneft' and Kaspmorneft' associations to overfulfill the assignments for both production of gross output and for its sale.

The overfulfillment of the plan as a whole, however, does not yet indicate a satisfactory state of affairs at all the leading sections of the sector. In the third quarter the oil extraction rates for a number of major oil and gas extractive administrations were noticeably lower than in the second quarter. A particularly tense situation was created at the Kaspmorneft' Association, where only two of the five NGDU coped with the nine-month plan for petroleum. As a result, the collective of the association, having provided over 60,000 tons of above-plan liquid fuel in the first six months, now have over a 29,000-ton debt.

In the last economic survey we noted the unsatisfactory work of the collective of the NGDU imeni N. Narimanov. The situation here not only has not improved since then, but on the contrary, has deteriorated. The administration was short 63,661 tons of petroleum for the nine-month plan. At the oil fields of NGDU, as before, there is poor use of the potential reserves for wells, and measures are not carried out actively enough to prevent premature flooding of the productive levels. Some of the blame for the lagging behind of the administration falls on the drillers, who violate the established schedules for turning the wells over for operation and do not always ensure their high-quality drilling. Complaints should also be made against the power engineers, who are to blame for there being deviations in the supply of electric energy, which results in shutdowns of the wells and large losses of fuel.

The slackening of work on the operational resources led to a sharp decrease in petroleum extraction at the NGDU imeni 50-Letiye SSSR, where the shortage was over 41,000 tons. The collective of the Administration imeni Serebrovskiy worked below its potentials, and owed 20,000 tons of liquid fuel.

Petroleum extraction also dropped at the Azneft' Association. In the first six months it had to its account over 27,000 tons of above-plan "black gold," but according to the results of the nine months--about 22,000 tons.

The reduction occurred due to the continued lagging behind of the Muradkhanlyneft' NGDU, which is working the promising deposit, discovered seven years ago in the eastern part of the Srednekurinskaya basin. Even though, as compared with the corresponding period last year, the petroleum extraction here rose 2.7-fold, the nine-month plan was not fulfilled and the shortage was almost 19,000 tons.

The lagging behind of the Muradkhanly workers in many ways stems from the unsatisfactory drilling rates. This year the field workers should obtain from the drillers 17 wells, including 3 exploratory ones, but they have so far obtained only 5. The industrial process for revealing the productive beds, carrying out separate jobs and methods of action in the area near the bottom of the wells has not yet been sufficiently worked out.

There are many other factors hindering an increase in petroleum extraction in the administration. So far, for example, it cannot be said with sufficient assurance that the structures of the wells being drilled at Muradkhanly meet the conditions for the most rapid opening up of this deposit, unique with respect to its geological complexity. Or take the problems of building up both the area of Muradkhanly itself and of other promising prospecting areas adjacent to it. At present the fulfillment of a number of urgent jobs for building it up is being delayed, and this, of course, seriously holds back putting into operation the rich reserves of petroleum extraction existing here.

In a word, the oil workers of Muradkhanly, just as all the scientific research and planning organizations in the republic connected in one way or another with the petroleum industry, are faced with a large set of problems, and how rapidly and efficiently the new storehouses of natural fuel will be placed at the service of the national economy depends on their successful solution.

In the third quarter the indicators for the well drilling were also lower than in the second; which, as was noted above, could not help but have an effect on the fulfillment of the plan for petroleum extraction. While according to the results of the first six months the Azneft' Association had 3,930 meters of above-plan drilling, in the nine months this indicator dropped to 181 meters. Just the Kyursanginskoye Drilling Work Administration and the Dzharlinskoye Drilling Work Administration alone were short almost 12,000 meters of drilling. The potentials of the modern drilling equipment are being poorly utilized by the collective of the Saatly Petroleum Prospecting Expedition, which also failed to fulfill the plan for the nine months.

The drilling indicators dropped sharply at the Kaspmorneft' Association, where the plan was fulfilled by only 95.3 percent. Performing unsatisfactory work were the Neftyanyye Kamni MUBR, the Peschaninskoye Administration and the collectives of the Primorskoye Marine Prospecting Drilling Administration and Bukhta Il'ich, which were short over 18,000 meters of drilling.

The underfulfillment of the plan for drilling is the result of insufficiently efficient labor organization at all stages of well drilling and violations in the production and industrial discipline. There are cases of a lack of assiduous attitude toward the equipment, which at times leads to long unproductive idle times for the drilling brigades.

One must not fail to direct attention to the fact that at some administrations the fulfillment and overfulfillment of the indicators for well drilling is achieved not by increasing the rates of the drilling, but by the maintenance of superfluous drilling rigs. This reproach should particularly be made to the Sangachaly MUBR, which in nine months gave 3,668 meters of above-plan drilling, but carried out the assignment for rates of speed by only 96.5 percent.

Another approach to the affair distinguishes the directors of the Bulla Marine Exploratory Drilling Administration. Here, with a smaller number of rigs than specified by the assignment, the planned drilling volume was not only fulfilled, but was overfulfilled by 1,715 meters. This was achieved due to the carefully thought-out organization of production and labor and the ability to utilize all the resources for increasing work efficiency and raising the rates (the collective of the administration exceeded the plan for drilling rates by over 100 meters a rig per month).

It would appear that the directors of the associations and the drilling enterprises should thoroughly analyze the economic aspect of the work of the underground drillers and take effective measures to ensure a sharp increase in the rates and improvement in the quality of the drilling, with the lowest expenditures, everywhere.

The most decisive days in the struggle to fulfill the plan and the commitments adopted have now arrived--the fourth, concluding quarter of the year is in progress. Many of the participants in the competition, inspired by the visit at the celebrations in Baku of Comrade L.I. Brezhnev, general secretary of the CPSU Central Committee and chairman of the Presidium of the USSR Supreme Soviet, fittingly marked the national holiday--the Day of the Adoption of the New USSR Constitution--and reported ahead-of-schedule fulfillment of the plan for three years of the five-year plan. There are many brigades and production collectives that are already working for the calendar of the Eleventh Five-Year Plan. These are, particularly, the brigade of I. Guseynov, distinguished drilling master and hero of Socialist Labor and the brigades for capital repair of wells of G. Guseynov from the Artermneft' NGDU and S. Faradzhev from the Shirvanneft' Administration. The brigades of M. Gambarov, hero of Socialist Labor, and M. Agayev from the Sangachaly Drilling Work Administration, of E. Aslanov and T. Bagirov of the Bulla MURB and many others are close to completion of the five-year plan.

The task of the party, trade union and Komsomol organizations and the directors of the enterprises is to make the experience of the outstanding workers in the competition, more rapidly, the property of all the collectives. It is necessary, while being guided by the instructions and advice of Leonid Il'ich Brezhnev, to develop a persistent search for new potentials for increasing production efficiency and raising labor quality. There is still time for the collectives who are lagging behind to take themselves in hand and fully make up for the state the debt that has formed with respect to petroleum extraction.

A great deal of attention should now be paid to preparing for work under the conditions of the inclement fall-winter weather. Winter is the most difficult time for the oil workers, and everything must be done so that the smooth flow of the petroleum conveyer experiences no interruptions, so that at all the sections of the petroleum operations the outlined production measures are carried out strictly according to the schedule.

The patriotic duty of the oil workers of Azerbaydzhan is to solve, with honor, the problems posed for the republic's workers by Comrade L.I. Brezhnev, to meet the 61st anniversary of the Great October Revolution in a worthy manner and to ensure the successful completion of the third year of the five-year plan with respect to all the indicators.

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FUELS AND RELATED EQUIPMENT

PIPE SUPPLY FROM VOLGOGRAD FOR TYUMEN'

Moscow PRAVDA in Russian 16 Sep 78 p 1

[Article by G. Ivanov: "They Serve Without Fail"]

[Text] ... Steel pipes, drilling rigs, petrochemical equipment, prefabricated apartment houses, reinforced concrete structures--that is by no means the complete list of what the enterprises of Volgogradskaya Oblast supply to Tyumen'. A delegation from the Volzhskiy Pipe Plant recently returned from a trip through the Tyumen' North. It became familiar with the gas pipeline being constructed from Urengoy to Vygnyapur to Chelyabinsk. The Volzhskiy workers are supplying the pipes for it. The pipes must be reliable, in order to serve without fail under the conditions of the North.

Will they satisfy these demands? Specialists of the Surguttruboprovodstroy Trust answer affirmatively, and they have no complaints. There is just one comment: the plasma processing of the ends of the pipes, as practical experience has shown, makes welding difficult under field conditions. In consideration of the wishes of the construction workers, equipment is now being prepared at the plant to introduce a different, mechanical method of processing.

An attentive attitude toward the demands of the Tyumen' consumers is characteristic of the Volzhskiy workers. Persistently improving the production, they are arming themselves with everything that makes it possible to raise the technical level of the output. The pipe workers have set up direct relations with the Novyy Lipetsk metallurgists, who are supplying the sheet steel, and have established a joint brigade of quality. Recently an agreement on collaboration also linked the plant collective with the construction workers of the gas pipelines.

The collectives of the Volgograd Barrikady Plant and of other enterprises are making a great contribution to opening up the valuable riches of Western Siberia.

Complex tasks face the transport workers. The flow of freight is growing, and more empty trains are required. The Betonnaya station workers set a

good example. They used the so-called double freight operation method: the unloading and loading is done in a single cycle. Still, there are many complaints against the railroad. Often the products lie at the enterprises waiting for railroad cars. Some of the freight could be shipped by water, upstream along the Volga to Kama, there to be transferred directly from the ships to railroad cars--and the station of destination is only a stone's throw away.

Long ago the idea of these mixed shipments was suggested, for example, at a pipe plant where the shortage of empty cars seriously complicates the work. The first barge was recently sent to the mooring, and was loaded with pipes. There was room on board, it may be said, for a whole gas pipeline 50 kilometers long. It looked as if the ice had been broken. But at the freight division of the Volgograd River port, they didn't speak so optimistically. Two years ago they had sent barges like that, but at Kama they didn't want to reload them.

After all, though, this is a very important and necessary matter. I would like to hope that the present attempt will be more successful. Let freight loads for Tyumen' be given the green light along the entire route.

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FUELS AND RELATED EQUIPMENT

PETROLEUM REFINERY CAPITAL INVESTMENTS, COSTS DISCUSSED

Moscow BYULETEN' STROITEL'NOY TEKHNIKI in Russian No 9, Sep 78 pp 28-29

[Article by R.P. Polyanskiy, chief of the division of Glavgosekspertizy, USSR Gosstroy: "The Experience of the USSR Ministry of the Petroleum Refining and Petrochemical Industry in Increasing the Efficiency of Capital Investments and Reducing the Cost of Construction"]

[Text] The division of oil and gas of Glavgosekspertizy of USSR Gosstroy discussed the basic plans for the construction of new and renovation of existing enterprises of the petroleum refining industry, from the example of which it can be seen that the USSR Ministry of Petroleum Refining and Petrochemical Industry is taking measures to increase the efficiency of capital investments and reduce the cost of constructing facilities in the sector. The ministry is consistently implementing a program of renovation and intensification of existing production, as the result of which there has been a substantial increase in the capacities of the enterprises for petroleum refining and synthetic rubber production, the product list has been expanded and the output of products of secondary petroleum refining has been increased. This makes it possible, with smaller capital investments, to fulfill the established assignments and considerably increase the sector's efficiency.

The volume of capital investments of the USSR Ministry of Petroleum Refining and Petrochemical Industry in the Tenth Five-Year Plan for the petroleum refining sector is distributed as follows: new construction--35 percent; modernization and expansion of existing petroleum refineries--52 percent; technical reequipment--13 percent.

Modernization or expansion of the existing petroleum refineries (NPZ) is making it possible to reduce the capital investments and raise the technical and economic indicators. Estimates show that expanding the Polotsk NPZ requires 40 million rubles less than the construction of a new plant. In the expansion of the Kirishi NPZ, the specific capital investments per ton of petroleum refined are half as much as for the construction of a new plant.

The development of the petroleum refining industry in the current five-year plan is being implemented by improving the production process for high-quality petroleum products, introducing catalytic processes, further production concentration and consolidation of individual capacities of industrial units, combining related industrial processes with a simultaneous improvement in the technical-economic indicators and introducing production automation on the basis of complete mechanization of the basic and ancillary production facilities.

The ministry has started construction of the combined LK-6u units, which combine the processes of primary petroleum refining, with a capacity of 6 million tons, catalytic reforming of gasoline--1 million tons, hydro-refining of diesel fuels and kerosenes--2.6 million tons and gas fractionation--450,000 tons. As compared with the construction of individual units with analogous capacity, the LK-6u units make it possible to reduce the construction cost by 10 percent, reduce the metal input by 30 percent, increase labor productivity by 45 percent and reduce the area for the building development and the length of the engineering lines.

Designing consolidated, combined industrial systems will give additional efficiency in constructing petroleum refining enterprises. Among them are: ELOU-AVT-6, combining the processes of electrodesalination in the primary distillation of petroleum, secondary distillation of gasoline and vacuum distillation of mazut; the LG-35-8-300B, combining the processes of hydro-refining of gasoline, catalytic reforming and extraction of aromatic hydrocarbons.

Putting into operation a combined unit at the Mozyr NPZ consisting of sections for desalinization and primary refining of petroleum, catalytic reforming and hydrorefining of gas fractionation made it possible, as compared with local units of the same capacity, to reduce capital expenditures by 11 million rubles, operating expenditures by 8 million rubles, metal input by 5,800 tons and the area of the building development 3.5-fold. At the same time, labor productivity rose 1.5-fold, and the profit per ton of refined petroleum--1.55-fold.

To reduce the estimated cost of construction, the USSR Ministry of Petroleum Refining and Petrochemical Industry discussed the state of construction of 160 carried-over construction projects specified by the plan for capital construction for 1976-1980, and, taking into consideration the readiness of the facilities and the possibility of introducing industrial changes, revised 46 plans, in accordance with which the capital investments subject to utilization in the Tenth Five-Year Plan were reduced by 3.3 percent.

Glavgosekspertiza, in accordance with the procedure for sampling, examined a number of plans revised by the ministry with a view to reducing the estimated cost of the construction. A check of individual plans showed that the reduction in the construction cost achieved by the ministry was mainly due to using advanced and efficient technical designs at the stage of the blueprints.

Particular notice should be taken of the work done by the ministry to revise plans with an improvement in the technical-economic indicators, through increasing the capacities of the basic production facility and changing the product list of goods produced. The relative reduction in the construction cost obtained through this is taken into consideration in summing up the results of work to reduced the estimated construction cost.

The measures taken by the USSR Ministry of Petroleum Refining and the Petrochemical Industry to reduced the estimated cost of construction were discussed by the board of USSR Gosstroy in March 1978. The board noted the favorable work done by the ministry and suggested eliminating some shortcomings, in this case bearing in mind:

Completion in as short a time as possible of the approval and reapproval of the plans for all the enterprises and facilities, the construction of which is being carried out or will be begun in 1978, without permitting construction according to obsolete and unapproved plans;

Concentration of capital investments and material and technical resources, which will make it possible to reduce the construction periods;

Taking measures for prompt development and putting into operation of enlarged machines and equipment;

Accelerating the development and approving the long-range plan for the sector's development, the lack of which is reflected in organizing the planning and the quality of the plans;

Improving the quality of the plans and the departmental expert examination in connection with evaluation of the reduction achieved in specific capital investments per unit of capacity, saving metal and building materials and reducing the estimated cost of the construction of individual facilities through incorporating the achievements of scientific-technical progress.

Attributing a large role to the expert organs of the ministries and departments of the USSR and the councils of ministers of the union republics in the further increase in the efficiency of capital investments and reduction in the estimated cost of construction, it appears expedient that, in carrying out this work, the favorable experience of the USSR Ministry of Petroleum Refining and Petrochemical Industry be taken into consideration, and that in the drafting and expert examination of the plans, particular attention be directed to solving problems of modernizing and intensifying existing production facilities, improving the quality of the plans, a saving of rolled ferrous metals, pipes and other building materials, reduction of specific capital investments to establish production capacities, an increase in the output-capital ratio and acceleration of the profit growth rates.

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FUELS AND RELATED EQUIPMENT

ADVANCES IN GAS PROCESSING AND RESEARCH

Tashkent PRAVDA VOSTOKA in Russian 21 Sep 78 p 3

[Article by Doctor of Technical Sciences, Professor U. Mamadzhanov, director of the Central Asian Scientific Research Institute of Natural Gas]

[Text] The gas industry is increasing the rates of its development from year to year. Our country occupies second place in the world in the volume of gas production and has emerged into first place in the length of main gas pipelines.

An important factor in further improvement of the indicators which characterize the work of gas technicians is the most rapid introduction of the latest advances of scientific-technical progress into production. The primary role in solving this serious problem belongs to branch science. A number of large scientific and planning organizations are working successfully in the gas industry, one of which is the Central Asian Scientific Research Institute of Natural Gas.

During the 13 years of its existence, an efficient collective which is successfully solving complex scientific problems was formed in it. It is sufficient to say that almost all gas fields of Central Asia are being developed from our plans.

During the past few years alone, we have completed 266 topical investigations and all of them were fulfilled by order of industry. More than 200 developments received the highest marks. Developments related to construction of sulfur-purification facilities evoked special interest among producers. Construction of them made it possible to organize production of more than 20 billion cubic meters of gas. A method of drying the bottom zone of gas wells, proposed by the institute and put into production, which increases their productivity 1.5-2 fold, resulted in a great advantage. The highly efficient method of drying the gas itself found extensive application at the Gazli, Achak and Shatlyk fields and at the Mubarek Gas Refining Plant. The efficiency of our recommendations to the gas transport associations involved in gas transport through main gas pipelines, is high.

One cannot enumerate all that has been done. We note only that our collective has returned 5 rubles to the state for every ruble invested.

Together with oil specialists from the Uzbekneft' Association, the institute conducted investigations on development and extensive introduction of plants to purify and dealkalize recycled water by the electric method to return it to circulation. Experimental tests were completed successfully and the Chimion Plant is now manufacturing 100 of these units.

Jointly with institutes of the Academy of Sciences of the republic, we are attempting to solve an important problem of purifying waste mineralized waters in order to use them for cotton field irrigation.

The institute has achieved appreciable success during the past few years in improving drill bits. All the plants of the country producing this most important tool were interested in the results, which make it possible to predict the quality of the bits. Part of our developments have been turned over and put into production by the Kuybyshev Production Association -- our country's largest producer of bits.

The institute must also solve large-scale problems in the future. Among the investigations planned for the second half of the 10th Five-Year Plan are development of an information retrieval system which makes it possible to rapidly receive finished calculations for planning and development of new fields, improving calculations methods to increase the operating dependability of gas field equipment and production processes and the use of mathematical-statistical methods to predict and determine reserves and volumes of gas production.

We are preparing a number of specific recommendations and proposals directed toward increasing the operational dependability and efficiency of the gas-pumping units of compressor stations of main gas pipelines for the gas transport associations. A method of determining objects for conducting prospecting-exploratory operations on territories studied long ago has been developed. Many objects have already been determined in Uzbekistan and Eastern Turkmeniya by using it, where one can expect to find deep anticline structures -- possible oil and gas traps. This is even more important since the existing fund of traditional structures has already been depleted to a significant extent.

The institute must solve enormous problems in the field of drilling wells, development of fields and in production, preparation and transportation of gas by enterprises of the Uzbekgazprom Production Association. The alliance of scientists and producers will become stronger from year to year.

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FUELS AND RELATED EQUIPMENT

COAL LOSSES DURING TRANSPORT

Moscow IZVESTIYA in Russian 17 Oct 78 p 2

[Article by Yu. Grin'ko, member of the editorial board of the journal, SOVETSKIY SHAKHTER: "An Anthracite Snowstorm"]

[Text] Everyone who has traveled by train has probably not missed meeting coal cars along the way, and of course, has worthily evaluated the black trails of dust over them.... But our subject will not be that of the discomfort of railroad journeys.

The volumes of hard coal shipments in the country are huge. The losses of it thus incurred are, unfortunately, also sizeable. It has been established for example, that out of each gondola-car loaded with fine fractions of coal, in a distance of 1000 kilometers the wind blows away up to a ton of the load. Every year almost 5 million tons of the valuable fuel remain on the crossties--the result of the work of the collectives of several mines.

The problem of preserving the fuel during shipments is not a new one. The most varied methods have been proposed for its solution. For example, the coal "caps" were covered with polyethylene film, sprayed with clay mortars, and were leveled off and are still being leveled off with special compactors. Not one of them, however, is fully satisfactory. Metal cars with covers could be constructed, but this is a very expensive business.

A simple and reliable method for preventing losses of the fuel due to its blowing away was found by the associates of the Moscow Institute of Fuel Minerals of the USSR Ministry of the Coal Industry by V. Ivanov, doctor of technical sciences, and I. Radovitskiy, candidate of technical sciences. In the course of the research, performed on an aerodynamics testing bench, they established that: it is most efficient and economically advantageous to use a protective covering, obtained from... water and low-grade petroleum products.

As was to be expected, the coal industry was the first to show interest in the innovation. Four years ago operational tests were made of industrial test units, constructed according to the designs of the Institute of

Dressing Solid Mineral Fuels. They confirmed the great efficiency of the emulsion covering. Then, on the assignment of the coal workers, the collective of the Leningrad Ciproshakht Institute made a standard plan for the unit. In December 1975 the USSR Ministry of the Coal Industry issued Order No 502. It determined: in the Tenth Five-Year Plan 15 units were to be constructed. The minister also required, with subsequent planning of mines, open pits and dressing mills, that such units be regarded as a component part of the industrial complex.

So far industrial-experimental tests have been made and there have been debates on the problems of where it is best to place the units, which of them to build first, and so far estimates have been determined and the funds precisely defined, and the institute's scientists have found an even more economical component for preparing the emulsions--petroleum wastes. The Vtornefteprodukt Association, which is engaged in gathering and regenerating the worked-out commercial oils, agreed to provide the miners with them.

Industrial use of the emulsion method to protect the coal has been implemented in the country at only two enterprises--at the Abashevskaya Dressing Mill in the Kuzbass and the Karandinskaya Dressing Mill in Kazakhstan. Two years ago units should have been put into operation at the Vorkuta Vorgashooskaya Mine No 1 and the Sibir' Dressing Mill in Kemerovskaya Oblast. The first is so far not in operation, and construction has not even begun on the second. There is difficulty in introducing emulsion protection at the mines in the Ukraine, even though it is here that the need for it is particularly great.

The slow rates of constructing the protective units at the USSR Ministry of the Coal Industry are inclined to be explained primarily by the difficulties in the financing procedure. All right, obviously there is a reason for this --the sector is engaged in the complex process of technical reequipment. But elements of priority given to local interests and departmental tendencies are also making themselves known. Some directors of production associations in the sector, knowing that not all the consumers have time and sufficient technical resources to check, efficiently and precisely, the weight of the fuel in the railroad cars coming to them, rapidly "calculated": it is more advantageous to pay fines for the underload revealed than to waste resources and energy on preventing the losses.

At the Ministry of the Coal Industry itself there are adherents of this unique point of view: what, they say, is the use of a protective film, if no less coal seeps out through the chinks in the gondola cars than is carried away into the air? As if the shortcomings in the work of the partner can serve as a justification for their own omissions!

Practical experience attests: the increasing pulverizing of the coal accompanies the general introduction of the narrow-grip equipment at the mines; the trains' rates of speed are inevitably increasing. All of this

yearly intensifies the problem of preserving the fuel along the way. The maximum use of any possibility for preventing losses of the "bread of industry" is an important condition for a further increase in production efficiency and fuller satisfaction of the national economy's needs for fuel and energy.

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FUELS AND RELATED EQUIPMENT

DIVERSIFICATION OF PRODUCTION IN LISICHANSK REGION

Moscow IZVESTIYA in Russian 5 Oct 78 p 2

[Article by N. Vakumenko, first secretary of the Lisichansk Gorkom of the Party, Voroshilovgradskaya Oblast]

[Text] Lisichansk, one of the oldest Donetsk cities, was developed long ago as a heavy industry center. Inexpensive fuel and large chalk and sand deposits predetermined the development of such energy-consuming plants here as soda and glass. Along with coal mining, they remained the dominant plants for many decades in the economics of the city and only later was chemistry added to them and then -- oil refining. Petrochemistry will also appear this year with introduction of an ethylene production complex at the oil refining plant. There were also enterprises of the light and food industry at Lisichansk, but they occupied a small specific weight in the city economics. Coal, soda and glass remained the main industries.

The situation was changed significantly after the 25th CPSU Congress, when the party posed the task of a universal increase of consumer goods production to the workers of all branches of industry. Much is being done for this in the industrial Donbass. A movement for increasing the output of products needed by the people was organized in all branches after the call of metallurgists of the Zhdanov Plant imeni Il'ich, which emerged as the initiator of the competition to increase production of consumer goods at heavy industry enterprises. This good call was also embraced at many enterprises of our city. A creative search was organized especially intensively after the October (1976) Plenary Session of the CPSU Central Committee, at which the need to achieve decisive changes in consumer goods production was noted. "This is an extremely important problem," comrade L. I. Brezhnev said in his speech at the Plenary Session, " a truly program problem both in the social and in the economic sense. It acquires special urgency during the current five-year plan."

A total of 16 enterprises of different branches of industry now produce consumer goods at Lisichansk. They have manufactured goods worth 603 million rubles, including goods worth more than 17 million rubles above the plan, since the beginning of the five-year period. The fraction of these

articles already comprises 33 percent in the total volume of industrial production. More than 600 types of goods with the mark of Lisichansk enterprises are now delivered to store counters.

It is gratifying to note that the workers at most enterprises treat consumer goods production with the same high responsibility as main production. Modern technology and goods specialists are being sent to the consumer goods shops and sections and a continuous search is underway for additional reserves. Clear organizational-technical measures have been compiled everywhere which are being successfully fulfilled.

The collective of the mechanical-rubber articles plant is working a lot on this problem. Inflatable boats, which enjoy wide demand among purchasers, have been produced here for several years.

A new technique of boat manufacture which makes it possible to double the production of this necessary product and to increase its quality and durability, was developed last year and has been introduced since the beginning of this year.

Appreciable success has been achieved at the glass plant. Crystal production has been organized here. When it was ascertained that the product is in demand and production of it brings many benefits to the enterprise, the production line was modernized. The furnace area for founding the glass has been expanded and annealing of articles and chemical polishing of them have been improved. The number of glasses for imprinting diamond rims was increased from 6 to 10 (and 4 more will be added to them in the near future). The new technique made it possible to improve the quality of the crystal and to reduce the amount of breakage in polishing the articles. A plan is now being developed to expand crystal production with introduction of an electric furnace. This will permit a threefold increase in production of the articles. Much still remains to be done in order to confirm the prestige of Lisichansk crystal, but the plant collective is full of resolve to bring its child to the highest level.

The fact that the prestige of people of new occupations engaged in consumer goods production will increase continuously may be regarded as a good sign of the last few years. Along with leading miners, oil refiners and builders, the names of the brigade leader of female glue workers of the mechanical-rubber articles plant O. Borodavka and her friend, who have manufactured 1,500 boats above the plan during this five-year period, are well known in the city. There is kind praise of the crystal polisher at the glass plant V. Semivolos and glass articles mold operator A. Kokina. Sewing machine operator R. Tulinnikova of the sewing plant is already working on the account of the last year of the 10th Five-Year Plan. These examples indicate that the party, Soviet, trade-union and Komsomol organizations and managers of many enterprises are actively struggling to implement the decrees of the CPSU Central Committee and the USSR Council of Ministers "On development of consumer goods' production and on measures to increase their

quality in 1976-1980." However, we know well that the contribution of the Lisichansk toilers to this important matter could be more significant.

The specific weight of consumer goods in the total volume of production is still low at most heavy industry enterprises. It does not exceed 2 percent of the total volume on the average. It would seem that there is only one path here -- to increase capacities, to increase labor productivity and to improve the quality of articles. However, the desire of collectives and the social organizations of the city does not always find active support on the part of the ministries and agencies. Here is a specific example. This year, due to the fact that the Ministry of the Oil Refining and Petro-chemical Industry of the USSR did not provide the mechanical-rubber articles plant with the necessary funds, the enterprise was forced to reduce the output of domestic-cultural goods worth almost 1 million rubles compared to what was achieved previously. Knowing how difficult it was to develop this direction of production and desiring not to fall behind the position already won, the plant collective appealed to the ministry with a letter and requested concrete assistance. Unfortunately, the staff employees of the branch did not even find time to answer the enterprise collective.

The glass plant found itself in a rather complicated situation. They were seeking the opportunity here to double the output of high-quality dishes, in wide demand, compared to the established task. But this initiative has not found the proper support of the Ministry of the Construction Materials Industry of the Ukrainian SSR.

The city workers should increase consumer goods production by more than 40 percent during the 10th Five-Year Plan. A new milk plant will become operational during this five-year plan and new capacities for nutritional gelatin production are being developed. An additional increase of production from existing shops and in consumer goods sections of heavy industry enterprises will be achieved by mechanization and automation of production processes.

We are also looking for reserves to combine the efforts of different enterprises. The collectives of the Strommashina and glass plants, for example, are working on development of articles from metal and crystal (door handles, window vases and possibly chandeliers in the future). This cooperation of enterprises of different agencies is very useful. But, unfortunately, there are few of these examples. It is frequently difficult to manufacture a good article from the production residues of one enterprise. And if the efforts of several plants or different agencies are combined, you look and something expensive is produced. Let us say that the trimmings of the conveyor belt and the so-called textile "fluff," which is produced in reprocessing old chutes at the mechanical-rubber articles plant, could be utilized extensively. Both the trimmings and the "fluff" are sent in tons daily to the waste heap. Closer cooperation of enterprises of different ministries is required. The party gorkom and ispolkom of the city Soviet, for example, would greet them if representatives of ministries having plants in our city and also planners and designers gathered at Lisichansk and held

discussions with our specialists, about what new consumer goods could be made. One feels that this would be beneficial.

There is yet another question of great interest for developing the consumer goods industry. We feel that the time has come to introduce a procedure in which construction of a new heavy industry object would provide, along with main production, introduction of a shop or shops for producing consumer goods. Take our city. The largest oil refining plant was introduced in 1976. But the planners gave no thought to what consumer goods it will produce. And now negotiations must be carried out with employees of Minneftekhimprom [Ministry of the Petrochemical Industry] of the USSR and opportunities must be found to eliminate this gap. And all this could and should have been provided beforehand.

The workers of the city, having organized an extensive composition to fulfill the tasks of the 3rd year of the five-year plan ahead of schedule, are devoting a great deal of attention to expansion of production and improvement of the quality of consumer products. They are striving to see that all goods manufactured by their hands correspond to the strict demands of the Soviet people.

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FUELS AND RELATED EQUIPMENT

LACK OF EQUIPMENT FOR COAL PRODUCTION

Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Oct 78 p 2

[Article by N. Sirenko, instructor of the oblast trade-union council, and G. Dorofeyev, special correspondent of SOTSIALISTICHESKAYA INDUSTRIYA]

[Text] "They have arrived," brigade leader of the working face workers G. Nosach said dejectedly to the combine operator. "The gallery is again unprepared."

The combine was stopped. These pauses occur rather frequently at the Krasnokutsk Mine Administration of the Donbassantratsit Production Association and this throws the entire collective off its working rhythm.

And it happens not only here. The noncomplex approach to mechanization of the main and auxiliary processes has essentially broken the production chain of coal production into small links. Shovels and other primitive devices work alongside powerful machines in all the production sections.

Let us take the working face. The coal is dug and the roofs are timbered here by narrow-grab complexes, while the galleries -- the roads for the combine -- are prepared by hand. Four-six persons per day are engaged in these operations on each wall. If one takes into account that there are an average of 1,600-1,700 working faces in the republic, this means that approximately 10,000 persons are engaged in this section of unproductive work alone. To this should be added the fact that complex coal getting at the wall itself does not join up with the manual work at the end of the wall. The miners usually lose hundreds of tons of coal at this "junction."

Rather complex problems have also occurred at the development faces. The main process -- driving -- has been mechanized here. Powder entry-driving machines have been developed for these purposes. However, problems of mechanization of timbering, delivery of materials and unloading them remain unresolved. Everything is unrelated because of this -- the low efficiency of the combine itself, the high labor expenditures and the low organization of production.

Conversations have been underway for many years about the need for complex mechanization of both the main and auxiliary coal-production processes. In 1970, by order of the minister of the coal industry of the USSR, the Voroshilovgrad Institute UkrNIigidrougol' [Ukrainian Scientific Research Institute for coal slurry extraction] was entrusted with the duty of solving problems "of mechanization of auxiliary operations and manual labor at enterprises of the coal industry." The Scientific-Production Association Uglemekhanizatsiya was created in 1972. The same UkrNIigidrougol' Institute and the Experimental Equipment Plant were included in it.

The association was initially in the system of Minugleprom [Ministry of the Coal Industry] of the Ukraine and was later subordinated to the Ministry of the Coal Industry of the USSR. The emblems on the building were changed but its tasks remain the same -- development, creation and introduction of machinery and mechanisms into the coal industry which facilitate the work of miners in auxiliary operations. Innovators and inventors of the mines have been recruited to this task.

Approximately 200 different types of machines and mechanisms have already been developed in total complexity. All this equipment is being displayed at the Voroshilovgrad Exhibition of Mechanization of Auxiliary Operations, on the basis of which a permanently operating All-Union intermine school of leading experience has been organized. More than 4,000 miners visit this exhibit annually. Many of them ask: "Where can one acquire one or another machine or device?" Answers of no less the same type follow these questions of the same type: "These machines do not exist, very few of them are being manufactured."

As early as 1974 a group of designers of the Uglemekhanizatsiya Association developed and tested a monorail track for delivery of materials, equipment and people in mines without rails. Use of it makes it possible to free tens of thousands of persons involved in manual labor in the country's mines. Calculations show that introduction of one track alone will permit a saving of 90,000 rubles annually. The demand is increasing, but it is being satisfied by 25-30 percent.

Another innovation -- the "DKN" road, designed to deliver materials and equipment in underground mines with rails where it is difficult or impossible for locomotives and other devices to work -- had the same fate. This road was put into production in 1975. The miners then gave it high marks. But there the matter ended. Only 30 units -- 20 times fewer than required -- were manufactured during 3 years.

"Our collective," says the chief designer of the Department of Mechanization of Face Operations of the Association N. Khizhnyak, "developed the 'OPK' support. It is used to support the roofs in one of the most complex sections of the wall. Its introduction increases work safety, releases five mine workers per day and increases the load on the face. However, all attempts to begin production of it resulted in failure. The developed drawings are lying in the folder."

"We can invent and design," says the First Deputy General Director of the Scientific-Production Association N. Smetana, "but there is nowhere to manufacture the new equipment."

A rather original situation has occurred. The designers have created new mechanisms. The experimental plant manufactures several units of experimental models which are exhibited for universal viewing. But then the finished drawings are hidden in the folder.

The gallery-cutting machine "Mir" is being displayed at the exhibition. It was manufactured in a single copy by the hands of innovators of the Izvestiya Mine of the Donbassantratsit Production Association. No one even talks about mass introduction of it.

SOTSIALISTICHESKAYA INDUSTRIYA has already written in the article "Small Series," published on 30 September 1975, about the fact that mass production of means of small mechanization has not been organized at coal machine-building plants. Approximately 3 years have passed since then. What has changed?

These problems were discussed in 1976 at a meeting of the board of Minugleprom of the USSR. An order was issued in February of last year which provided for an increase in production of the machines and mechanisms. It was pointed out precisely here which plants should produce what. However, 16 months have passed since this document was published, but no one knows how it is being fulfilled.

"We attempted to gather these data," says the chief of the department of coordination and planning of scientific research of Uglemekhanizatsii V. Safronov, "but nothing came of this. The plants did not answer our letters and did not respond to our telegrams."

What is being concealed behind this intriguing silence? The picture was made clear when we met with the direct executors of this order.

There are 30 ore repair plants in Minugleprom of the Ukrainian SSR. They should manufacture 30,000 units of equipment for mechanization of auxiliary processes this year. The question immediately arises: "Why 30,000 rather than say 100,000?" They explained to us that they proceeded from calculation of existing capacities in compilation of the program.

There is no doubt that this factor is the determining one. But if one takes this as a basis, the plan is clearly underestimated. The plants are essentially underloaded. The shift coefficient comprises only 1.1-1.3 here. For example, 80 percent of the equipment generally does not operate during the second shift at the Bryansk Ore Repair Plant of Voroshilovgradskaya Oblast. There is low organization of labor here, no production lines and the idle times of units are long.

As we can see, this good order was not followed by serious and meticulous work in the main direction -- organization of production and support of it with the necessary materials, without which complex mechanization of coal enterprises remains a good desire.

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FUELS AND RELATED EQUIPMENT

COAL SUPPLY PROBLEMS DETAILED

Moscow GUDOK in Russian 27 Sep 78 p 1

[Article: "Coal -- The September Accounting"]

[Text] September is coming to an end. Fuel concerns are now emerging into the forefront. The warehouses of the enterprises and electric power plants must be urgently filled with coal and petroleum products. The reserves are lower than during this same period of last year. And the September duty of the railroad workers in the additional task of coal exceeds 2 million tons.

Why has this situation developed? Perhaps the miners slowed their production rates? No, there is enough coal. An especially large amount of it was accumulated in the piles of mines of the Southern Kuzbass and the boiler rooms of Kazakhstan. One may also not say that there are not enough open cars in the stock of the railroads that solve coal-loading problems, although this type of rolling stock is now undoubtedly the scarcest type.

Let us take for example the Donetsk Railroad. More than half of the scheduled obligation is on its account. Whereas the railroad workers were able to cite the weak delivery of fuel to the transport workers during the first half of September, the situation with production has equalized during the second half. But the coal conveyor nevertheless continues to operate with interruptions. The low organization of shipment is now delaying its course: an average of 700 open cars less than the task are released here every 24 hours. To whose account should this be made -- the railroad workers or the transport workers of industrial enterprises. It should be made to both of them. Some are slowly transporting local freight and others are shipping it at turtle speeds. For example, 10-15 cars with raw material are formed up daily in line on the access tracks to the Makeyevka Metallurgical Plant. How can there be a shortage of open cars here!

We note in all fairness: the adjacent railroads are supplying the Donetsk Railroad with insufficient open cars. It has an average shortfall of 280 units of this rolling stock daily. The Odessa-Kishinev, Azerbaijan and Belorussian railroads arrange it with unenviable constancy. The directors

of these railroads must strengthen regulation discipline within the shortest deadlines.

The workers of the Western Siberian Railroad also lag behind the task of coal shipments by 760,000 tons. Like the Donetsk Railroad, unloading must also be urgently corrected here: 750 open cars remain full daily by the end of the normative time. And the river transport workers are mainly creating storehouses on wheels. The directors of the freight service of the railroad must increase the requirements on them.

The coal conveyor on the road and the excess transit -- approximately 9,000 cars -- will be speeded up appreciably. It is clear that they must be released as soon as possible. The carrying capacities must be increased and return of empties must be accelerated.

And what is happening on the Tselinnaya Railroad? True, its duty is much less than that of the Donetsk and Western Siberian. But this is in no way a basis for smugness. Prior to 18 September, both the plan and the additional task had overlapped on the Tselinnaya Railroad. They are presently unable to cope with one and the other. We note that the lion's share of the lag is recorded to the account of Ekibastuz. Block trains with coal being sent to the electric power plants of the Southern Urals stand idle here for days. And all because of unstable operation of the locomotive park.

The low rates of unloading also attract attention. Having accumulated a large excess of local freight, approximately 400 unreleased open cars remain daily on the Tselinnaya Railroad. And transit is moving too slowly. Thus, the turnover of the open car is artificially slowed.

The directors of the Southeastern Railroad have also not organized coal shipments in the best manner, although all conditions for clear realization of the task in fuel shipments are visible here. It is not being fulfilled for only one reason: they "forgot" that fuel is the number one freight.

The railroad workers of the L'vov and Central Asian railroads deserve kind words in this sense. They value the importance of the bread of industry to their credit and are providing open cars to the miners completely and on time.

A very important, crucial moment has arrived when fuel shipments must be accelerated. Where should the main efforts be concentrated? The points of their application are obvious -- increase the rates of unloading and accelerate the movement of rolling stock.

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FUELS AND RELATED EQUIPMENT

BRIEFS

OIL EXPLORATION--This acoustic apparatus is capable of detecting oil and gas beds even through the casing and cement reinforcement of a borehole. The scientists of the Leningrad Branch of the Mathematics Institute imeni V. A. Steklov of the USSR Academy of Sciences gave the apparatus this keen vision. Acoustics was used until now only to monitor the technical state of the wells. Investigations conducted by mathematician-scientists on the task of geophysicists revealed essentially new capabilities of the seismo-acoustic method in prospecting and field geology. The results of testing experimental models of the apparatus at oil fields in the Tatarskaya ASSR and on the Mangyshlak Peninsula have received high marks of specialists.

[Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 4 Oct 78 p 2] 6521

GAS PRODUCTION--Yet another enterprise has been added to the numerous gas-producing and refining enterprises of Uzbekistan: the Severosokhskoye underground gas storehouse. Experimental-industrial pumping of the "blue fuel" into deep underground cavities was begun, which also become a unique natural gas storehouse. The Severosokhskoye underground storehouse will become one of the largest in Central Asia. It is planned to construct an additional 10 underground gas storehouses in the territory of the Central Asian republics in the near future. They will appear in regions of Taskent, Chimkent, Dzhambul, Frunze and Alma-Ata. These plants are being worked out by the Central Asian Scientific Research Institute of Natural Gas. [Text] [Tashkent PRAVDA VOSTOKA in Russian 10 Oct 78 p 3] 6521

ARCTIC GAS PRODUCTION--The 20-billionth cubic meter of gas was delivered yesterday to the smelting furnaces of the Noril'sk Mining-Metallurgical Combine through the Messoyakha-Noril'sk pipeline, which became operational 10 years ago. The gas fields in the Taymyr have been expanded 10-fold during these years. The new Soleninskoye and Bagayevskoye fields have become operational. Such a quantity of gas is now being produced in the fields of the Taymyr that the Nadezhdin Metallurgical Plant under construction can now be supplied with it. Construction of the third filament and the condensate pipeline is now being completed on the main gas pipeline. The gasoline and diesel fuel produced from the gas condensate will be delivered to consumers next year. [Text] [Moscow SOTSIALISTICHESKAYA INDUSTRIYA in Russian 8 Oct 78 p 1] 6521

OIL FROM DEVONIAN DEPOSIT--Akhtyrka, Sumskaya Oblast (RATAU)--An unusual gusher of oil was struck at the second well at the Bugrovatskoye deposit. For the first time in the republic, "black gold" was obtained from a depth of 6,000 meters--from folds of the extremely ancient Devonian deposits. On the way to the underground storehouses the oil workers had to overcome many difficulties. Advanced drilling technology helped them to cope with the huge formational pressure and high temperatures. The newest methods of geophysical research, with subsequent data processing on an electronic computer, were also used. [Text] [Kiev PRAVDA UKRAINY in Russian 6 Sep 78 p 2] 12151

CSO: 1822

KAZAKHSTAN WATER RESOURCES AND LAND RECLAMATION EFFORTS DESCRIBED

Irrigation Through Irtysh-Karaganda Canal

Tselinograd FREUNDSCHAFT in German 24 Jun 78 p 2

[Text] Karaganda. The Irtysh water now comes to the fields of central Kazakhstan. Breaking up into thousands of rivulets, it waters the plants and makes the steppes bloom exuberantly.

"Nearly 250 million cubic meters of water--a whole lake--pass the locks of the Irtysh-Karaganda Canal to meet the requirements of agriculture of vital water," says the director of the canal system, G. M. Kormukhin.

In the new specialized "Kazakhstan" sovkhoz, potatoes are grown on 500 hectares of irrigated land. Adjoining the "Kazakhstan" sovkhoz is another specialized large-scale farm, the "Mirnyy" sovkhoz. This year a large percentage of the output of these two farms will serve to furnish the population of the region with vegetables and potatoes.

Alongside the canal, there are more than 10 farms. The Irtysh water is used to irrigate not only vegetables and potatoes, but also corn and other silage cultures, annual and perennial greens, as well as root vegetables; these irrigation measures greatly improved the feed basis of the state-owned cattle industry. At present, efforts are being made--especially in the Pavlodar region--to develop irrigation through reservoirs. This spring, the Pavlodar region consumed over 100 million cubic meters of water for the irrigation of 24,000 hectares of land.

The operators of the canal system have a great many worries. Over a stretch of 458 kilometers, the complex installations and mechanisms must function without a hitch.

The Karaganda canal section is operated by the Section 2 Collective headed by S. T. Suvorin. The experienced operator of Pump Station 15, T. Mironova, ensures an uninterrupted water supply.

Scientists Develop Water Resources

Tselinograd FREUNDSCHAFT in German 27 Jul 78 p 2

[Text] It will hardly be necessary to point out the importance of soil irrigation. In the report of comrade Leonid Ilich Brezhnev and in the resolution adopted by the July plenary session of the CPSU Central Committee, attention is drawn to the great importance of fully and efficiently utilizing the water resources in agriculture.

In the last few years, the Kazakhstan scientists--enjoying continuous support by party and soviet organizations and collaborating with expert specialists and economic organizations--were instrumental in researching the available water reserves and in expanding them through drawing on ground water. These reserves are so extensive that it will be possible at some time in the future to obtain up to 1,960 cubic meters of water per second. The water reserves, which have now been thoroughly explored, are presently sufficient for supplying agriculture with 350 cubic meters of water per second; in 10 to 12 years, the volume will be 2.5 to 3 times as great.

This is especially important for the drought-threatened rayons in the south, northwest and northeast of the republic, where conditions are favorable for extending and developing irrigation-based agriculture and for the irrigation of vast pasturelands. In our opinion, it would definitely be advisable to create--on the basis of subterranean lakes--dozens of new extensive oases, where it would be possible to obtain high crop yields--higher yields than would be obtainable on non-irrigated land. Artesian wells likewise improve pastureland yields.

The resolutions adopted by the July plenary session of the CPSU Central Committee direct the scientists toward ensuring greater effectiveness in their research work in the interest of an accelerated development of agricultural production and in the interest of the socio-economic and cultural development of the villages. Our Institute for Hydrogeology and Hydrophysics has prepared a map indicating the location of the Kazakhstan groundwater resources; this map will be passed on to the economic and planning organizations. At present, we are preparing a map concerning the utilization of water resources which are of immediate practical importance as well as a monograph outlining the regional distribution of artesian wells.

Hydrants on Kazakhstan Pastures

Tselinograd FREUNDSCHAFT in German 27 Jul 78 p 2

[Text] The shepherds in the scorching heat of the Kerbulak steppe in the southern Balkhashkiy region need only open the hydrants to water their sheep. Fifty kilometers of steel and polyethylene pipes--a "water conduit

fan"--have been laid here for the purpose of watering livestock. The water conduit is fed by springs in the Transili-Alatau foothills.

Along the water conduit, watering stations equipped with easily accessible hydrants have been set up for the livestock. Thus it is possible efficiently to utilize 60,000 hectares of pastureland lacking surface freshwater springs. Since the beginning of the Five-Year Plan, new watering stations--including some equipped with hydrants--have been set up on 12 million hectares of Kazakhstan pastureland. In response to the resolution adopted by the July plenary session of the CPSU Central Committee, the Kazakhstan meliorators are accelerating the establishment of livestock watering stations on the pasturelands.

In connection with the planned further extension of these projects, measures are being taken in our republic which are aimed at consolidating the production basis of water management.

Cultivation of Saline Soil

Tselinograd FREUNDSCHAFT in German 4 Aug 78 p 2

[Text] In North Kazakhstan, the tractor operators have started to turn up 100,000 hectares of land not included in the crop rotation system. The work is carried out by special teams equipped with approximately 10,000 powerful tractors, disk harrows, surface diggers, and cultivators.

As was learned from past experience, unproductive soils can be converted into highly productive forage crop acreage. For example, in the "Leninskiy" sovkhoz in the Timiryazevskiy Rayon, 6,000 hectares of agriculturally unsuitable land have been cultivated. This land now produces over 15 hundredweights of hay per hectare--a hay rich in protein--as compared to the 3 hundredweights produced previously. And in the "Leninskiy" sovkhoz in the Sovetskiy Rayon, the cultivated saline soils produced 20 hundredweights of white clover per hectare.

Likewise, saline soils produced crops at the "Iskra," "Amangeldinskiy," "Konyukhovskiy," "Nalobinskiy," and "Kuybyshev" sovkhozes and at the "Mamlyutskiy" stock farm.

Other farms in the region likewise take advantage of the positive experience gained. They are assisted by the specialists of the North Kazakhstan branch of the "Zelingiprozem" Institute and of the regional agrochemical laboratory. It is in accordance with their projects--which were developed on the basis of thorough examinations--and with the recommendations made for each type of soil that the farms' unproductive soils are improved.

"The development of the extensive saline soil complexes," says the deputy head of the regional agricultural administration, G. Nikolenko, "will be an important contribution toward the accomplishment of the tasks set by the July plenary session of the CPSU Central Committee in regard to the consolidation of the feed basis of livestock breeding. The cultivation of unproductive soils will also improve the situation in agriculture; it will be possible to set aside some of the acreage for grain growing, to expand the fallow land, and to accelerate the introduction of the crop rotation system."

Various Irrigation Projects Described

Tselinograd FREUNDSCHAFT in German 15 Aug 78 p 2

[Text] The corn growers of the "Rozybakiyev" sovkhoz in the Alma-Ata region plan to obtain crop yields twice as high as projected. The meliorators helped to set new targets. Here, in the Kapchagay Reservoir area, a canal, 6 kilometers in length, was put into service--several months ahead of schedule. This canal will ensure higher soil productivity.

Since the beginning of the year, another 20,000 hectares of land--i.e. 4,000 hectares more than were stipulated by the plan--have been provided with new irrigation systems.

The construction of large-scale irrigation systems is being continued in the Karagali and Chersk Reservoir areas and in the Irtysh-Karaganda Canal zone. The new Kandyssu Reservoir is being filled. The rice plots in the new Yanykurgan-Chiili, Tokusken, Chingildy, and Akdala complexes are being expanded. The second stage of the Kasali complex on the right bank and the first stage of the Ksyl-Orda complex have been put into service. The complexes in the Ksyl-Kum desert and the Tashutkul Reservoir area are being developed at an accelerated pace.

In the present Five-Year Plan, the irrigated acreage in Kazakhstan will increase by over 4 million hectares.

Freshwater Reservoirs

Tselinograd FREUNDSCHAFT in German 14 Oct 78 p 2

[Text] The freshwater reserves of the Talas-Assa complex, the exploration of which in the Tien Shan foothills has now been brought to a close, will be sufficient for irrigating a new agricultural oasis extending over 10,000 hectares. These reserves are all the more valuable, since they are close to the operative main canals, which channel the river water to the wheat fields and beet and corn plantations in Dzhambulskaya Oblast. Moreover, the new buildings of the Karatau-Dzhambul regional complex likewise are close by.

The Alma-Ata hydrogeologists found that this subterranean "lake" was formed by the mountains. It is a water-filled stratum composed of sand and gravel, which were carried here from the mountains by the rivers.

Recently the scientists succeeded in making available to the national economy some natural freshwater reservoirs in the south of the republic, which originated in the high mountains. The largest of these reservoirs--the Talgar Reservoir--was discovered at the base of the Transili-Alatau. At present it supplies 25 percent of the water consumed by Alma-Ata; this water does not require purification.

Melioration Measures Described

Tselinograd FREUNDSCHAFT in German 11 Oct 78 p 2

[Text] At the July plenary session (1978) of the CPSU Central Committee, the secretary general of the CPSU Central Committee and chairman of the Presidium of the USSR Supreme Soviet, comrade Leonid Il'ich Brezhnev, stated: "Now as before, it is necessary persistently to promote soil improvement. The main objective here must be to improve the utilization of the meliorated soils and to accelerate their lagging economic development. Large sums are being invested in soil improvement. The basis for efficient production has been established and cadres have been trained.

The problems in connection with the steady growth of agriculture under the complex natural conditions in Kazakhstan are bound up with an extensive development of soil improvement.

In the years following the May plenary session (1966) of the CPSU Central Committee, approximately 4 billion rubles were invested in the construction of hydroeconomic installations in our republic; of this total, nearly 1 billion rubles were invested within 2 years of the 10th Five-Year Plan. Approximately 770,000 hectares of newly irrigated land were put into service so that the irrigated acreage in the republic comprises over 1.8 million hectares.

Among the hydroeconomic installations that were put into operation are the following: The Chardara Reservoir, which has a capacity of 5.7 billion cubic m; the Ksyl-Kum irrigation system, which irrigates 45,600 hectares in Chimkentskaya Oblast; the Kasaly irrigation complex on the Syr-Darya and the left-bank irrigation complex in the Ksyl-Orda region; the Tash-Utkul Reservoir in Dzhambulskaya Oblast; the Bosoi, Akadala and Chingildy irrigation complexes in Alma-Atinskaya Oblast; the Charak Reservoir in the Semipalatinsk region; the Dzhesdy Reservoir in Dzhezkazganskaya Oblast; the Uydeny ferro-concrete complex in the East Kazakhstan area; the Ural-Kushum irrigation system in the Uralsk region, and dozens of other large-scale projects. The first stage of the Irtysh-Karaganda Canal--which is unique in regard to its scale and importance for the national economy--was completed and put into operation.

Furthermore, over 7,500 kilometers of water pipes were laid and put into service; these pipes provide 620 settlements of the republic with water. Extensive work is being done in regard to the irrigation of pasture lands.

The automation of water regulation has been completed at the following projects: At the Ksyl-Kum Canal in Chimenskaya Oblast; at the first construction stage of the Georgiyevka irrigation system and of the Talas Reservoir in Dzhambulskaya Oblast, and at the integrated hydraulic systems at the Kaskelen and Talgar Rivers in the Alma-Ata region. The automation work at the Tentek and Karatal irrigation systems in the Taldy-Kurgan region, at the left-bank main canal in the Ksyl-Orda region, at the Darbasa and Abai group water conduits in the Chimkent region, and at the Bel-Agach and Korosteli water conduits in the Semipalatinsk region is being continued. The introduction of automation helped improve the utilization of the irrigation systems and to adapt them to industrial uses.

The establishment of soil irrigation systems based on the use of ground water proceeds at a great pace. Along with wells equipped with low-down pumps, a ferro-concrete distribution network is being built, and sprinkler systems are being used on a large scale.

The fast pace of the melioration work, the changeover to technically perfect irrigation systems, and the improvements in the utilization of irrigated lands ensured steady increases in field productivity and in the production of agricultural products on irrigated acreage. Thus, as compared to 1966, rice yields increased by 16.6 hundredweights; for corn, cotton and vegetables, the increases amounted to 15.5, 9, and 20 hundredweights respectively. While the irrigated land in our republic constitutes approximately 5 percent of the total arable acreage, it supplies 30 percent of the total agricultural production.

In the last 10 years, our republic produced a large number of agricultural experts who showed that--given the correct utilization--the possibilities of increasing the crop yields on the irrigated land are unlimited. In 1977, the average yield on the 2,100-hectare corn plantations of the Lenin kolkhoz in the Enbekshikazakhskiy Rayon (Alma-Atinskaya Oblast) totalled 110 hundredweights per hectare; team leader A. Shamshutdinov even obtained 143.6 hundredweights. At the Ryskulov kolkhoz in the Talgar Rayon in the same region, the team headed by M. Kirichenko harvested 723 hundredweights of vegetables per hectare. The Nikolayevskiy sovkhoz in the Kustanai region harvested 324 hundredweights of vegetables and 260 hundredweights of potatoes from irrigated acreage.

In the last few years, the republic's hydroeconomic service was strengthened considerably. The organizations involved in the construction of hydroeconomic installations and the industrial enterprises acquired more technical equipment.

Seven planning and research institutes are engaged in the planning of hydroeconomic installations. Thirty-five construction and assembly trusts of the main administration for the construction of hydroeconomic installations in the Kazakh SSR Ministry of Land Reclamation and Water Resources and of the main administration for sovkhoz construction are engaged in the construction of hydroeconomic installations.

The tasks set for the meliorators of our republic for the 10th Five-Year Plan are extensive and call for great responsibility. They must put into service 410,000 hectares of newly irrigated acreage, irrigate 25 million hectares of pasture land and further improve another 77,000 hectares; they must lay 680 kilometers of water pipes and modify the irrigation network on 293,000 hectares.

As compared to the eighth Five-Year Plan, grain production on the eighth irrigated acreage in Kazakhstan is to increase 160 percent. Likewise, the production of sugar beets, cotton, vegetables and other agricultural products is to be increased considerably. The production of forage crops will undergo extensive development.

In the Syr-Darya basin, the construction of a number of large-scale irrigation complexes in Kzyl-Ordinskaya and Chimkentskaya Oblasts will be completed, in order to facilitate the economic development of these systems. Extensive complexes in Dzhambulskaya, Alma-Atinskaya and Taldy-Kurganskaya Oblasts are to be reclaimed for beet cultivation; in the Chimkentskaya Oblast, the Keles and Kzyl-Kum complexes are to be reclaimed for cotton cultivation, and areas in the Irtysh-Karanganda Canal region for the cultivation of vegetables and potatoes.

To ensure the water supply of rural settlements, the construction of the Urkash, Smirnovskiy, Bosoi, Kustanai, Sergeyevka, Maiskoye, Yablonovo, Sakharovo and other group water conduits is being continued.

Extensive projects are being planned concerning the expansion and reconstruction of the present production basis of the water management organizations.

This year, it is planned to invest approximately 500 million rubles in the construction of hydroeconomic installations, to develop 87,000 hectares of newly irrigated land, to rebuild irrigation networks, to increase the water supply on 63,000 hectares, and to lay 194 kilometers of water mains. These are truly grandiose objectives. A meliorator collective comprising 100,000 members is devotedly trying to attain them.

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